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MEDICAL CLINIC:

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VOL. II.

DISEASES OF THE CHEST.

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DISEASES OF THE CHEST.

FIRST BOOK.

DISEASES OF THE HEART.

1. Since the publication of the immortal researches of Corvisart, and of the numerous works which have, since his time, extended the domain of science, the history of diseases of the heart and its appendages should be considered as almost completed. In the following observations we shall call attention particularly to certain points of this history, which, after so many researches, still appeared capable of being illustrated by additional facts.

SECTION I.

OBSERVATIONS ON DISEASES OF THE PERICARDIUM.

2. Most of the morbid phenomena to which acute or chronic inflammation of the pericardium gives rise, seem to depend on the sympathic disturbance, which is felt either by the heart or by other organs. These phenomena must then be extremely variable with respect to their nature and their intensity; they must present as many differences as there are in the sensibility of each individual, in the number and activity of the sympathies of his organs. It is the same in this respect with diseases of the membrane covering the heart as with the membranes covering the cerebro-spinal system. It would, to be sure, be a desirable thing that such a lesion was always indicated by such a determinate group of symptoms; but such a thing occurs in only a very small number of cases: thus to endeavour to connect with any lesion symptoms always identical, is to retard the improvement of diagnosis in wishing to simplify it. It would be a task at least as useful to endeavour thoroughly to know the symptoms, as numerous as they are varied, which may depend on one and the same lesion. It is not certainly with practical medicine as with several other branches of human knowledge, where a small number of principles being given, nothing remains but to apply them to all the particular cases. In medicine, on the contrary, where a fact is never precisely similar to the facts already observed, it is necessary continually to *individualize*, if I may say so; in that consists the entire art of diagnosis, and thence it is that the well-instructed physician who has seen most, must also see best.

CHAPTER I.

ACUTE PERICARDITIS.

3. The following cases are of three kinds: the first will point out inflammation of the pericardium announced by local symptoms, which render its dia-

gnosis sufficiently easy. We shall then give other cases, in which there was no other local symptom than greater or less dyspnœa; so that it was only by a process of exclusion* that the existence of pericarditis could be recognised. Finally, in a third class, will be found cases of a rarer description, in which the acute pericarditis was not even announced by dyspnœa, and in which it produced no other symptom than great acceleration of the pulse, nervous phenomena of a severe kind, sudden prostration of strength, and death.

ARTICLE I.

CASES OF ACUTE PERICARDITIS WITH CHARACTERISTIC SYMPTOMS.

Case 1.—Acute articular rheumatism—Suddenly a sharp pain in the region of the heart—Speedy death—Purulent exudation on the internal surface of the pericardium.

A baker, thirty-one years of age, entered the La Charité in the course of the month of August, 1822. For the last fifteen days he had been affected with acute pains, which ran through different articulations, and which at the time of his admission were seated in the articulations of the elbow and wrist of the left side, the right knee and foot of the same side. All these parts were swollen and red. Several times since the attack of this rheumatism he had severe headachs; the fever was intense; the tongue was red and a little dry; the epigastrium sensible to pressure. Two bleedings of twelve ounces each were resorted to the first twenty-four hours. The coagulum of blood was covered with a thick buffy coat. The next day there was no perceptible amendment; a third bleeding was ordered; blood buffed as the preceding; the knee and foot of the right side ceased to be painful, but at the same time the left knee swelled; the elbow and wrist of the left side were less swollen, and were free from pain in the state of rest, but the least motion excited acute pains in them. (Bled a fourth time to twelve ounces; cataplasms, &c.; blood buffed.) On the fourth day after his admission, and notwithstanding his having been bled four times in three days, the elbow, wrist, and knee of the left side were swollen and very painful; the tongue lost its redness; twenty leeches were applied around the knee. On the fifth day there was but very little pain in the latter, but the right knee then became affected; state of the elbow and wrist of the left side the same; fever still continued. (Emollients; cataplasms.) On the sixth day the same state. (Another bleeding to twelve ounces; ten leeches around the right knee; ten more to the left wrist.) In the course of the day a visible amendment took place: the different articulations are less swollen, and admit of being moved without much pain; the patient himself states that for the first time he finds himself considerably better. But this was not to last long: towards eight o'clock at night all his joints were almost free from pain; but at ten o'clock he was seized all at once with a violent pain a little above and within the left breast; this pain continued all the night, and the next morning we found him in the following state:—Loud screams in consequence of the very acute pain in the part just mentioned; this pain was not increased either by pressure, by cough, nor by the inspiratory movements, nor even by change of position; consequently it does not possess the characters either of a pleuritic or of a muscular pain; the joints are completely free from pain. Besides, there is no cough whatever; chest sonorous; respiratory murmur clear, but very strong; beatings of the heart very frequent, tumultuous, irregular in strength, and intermittent; the pulse also intermittent, but very small, and compressible. Features pale, sharpened, expressive of the most intense anxiety; extremities cold. This alarming aggregate of symptoms

* *i. e.* Negatively, or what it is not.—Tr.

was referred to inflammation of the pericardium. The patient seemed so weak, that M. Lerminier did not think it expedient to bleed him again. (Thirty leeches were applied to the precordial region; sinapisms to the extremities, with the view of bringing back the rheumatic affection, which by a species of metastasis seemed to have seized on the pericardium.) No amendment took place in the course of the day; the respiration, which was tolerably free in the morning, became more and more embarrassed, and he died the following night, twenty-nine hours after the commencement of the precordial pain.

The examination of the body confirmed the correctness of the diagnosis. The entire internal surface of the pericardium was lined by an exudation which was whitish, soft, membraniform, and presenting an areolated appearance. Beneath this exudation was observed intense redness of the pericardium. There was no fluid effused into its interior; there was about an ounce of greenish serum obtained from it.* The substance and the different parts of the heart healthy. The pleura merely presented some old cellular adhesions, and the lung a sero-sanguinolent engorgement. The stomach was a little red along its great curvature.

Remarks.—We have here one of the most acute cases of pericarditis on record: it lasted but twenty-seven hours, and its commencement followed close on the disappearance of the articular rheumatism. We shall presently see inflammations of the pleura and lung also manifest themselves on the sudden disappearance of rheumatic pains of the joints. This is what the ancients called rheumatic metastasis.† These facts merit all the attention of the practitioner. We may observe also, how ineffectual the several bleedings in this case were, either to remove the articular rheumatism, or to prevent the pericarditis.‡ Here the sympathetic irritation of the central organ of the circulation was the cause of all the symptoms and of death. The pericarditis was recognised by the nature of the local symptoms—to wit, the pain in the precordial region, the tumultuous and irregular beatings of the heart, the great frequency, the irregularity, and extreme smallness of the pulse. This particular state of the heart and pulse has been set down by authors as characterising pericarditis. However, the following case will show us an affection of the pericardium nearly identical, with a very different state of the beatings of the heart, and especially of the pulse.

Case 2.—Pain at the lower part of the sternum, and in the region of the heart, becoming intense by degrees, succeeding articular pains—Pulsations of the heart obscure; pulse strong and regular—False membranes in the pericardium.

A negro, nineteen years old, a tailor, of rather a weak constitution, but in the

* The dulness of sound, which has been given as one of the characteristic signs of pericarditis could not then exist in this case.

† This metastasis is not always followed by a pericarditis, pleuritis, or pneumonia. What may be remarked in more than one case of this kind, is the lesion of function, which is more intense than the lesion of texture seems to be. Thus, after the disappearance of a rheumatic pain, we observe palpitations, an acute pain in the precordial region, a pleuritic stitch, greater or less dyspnœa. But the readiness with which these different symptoms disappear will not allow us to attribute them to a serious alteration in the texture of the organ which is the seat of them. Still these symptoms present features at least as alarming as those which would result from hepatisation of the lungs, or from purulent effusion into the pleura or pericardium. The same cause which on one and the same day will produce pain in ten different joints, which will be seen to return to the healthy state as rapidly as they became affected, this same cause, I say, may then, when it directs its influence towards some internal part, produce there either a simple modification of action, or a lesion of structure. This second lesion is but consecutive to the first, and rarer than it.

‡ We shall find in this work frequent instances of inflammations, which, being attacked from their commencement, or during their course, by copious bleedings, still continue their course, whether they are to terminate in health or death. There are, I think, but very few cases in which a disease can be thus removed all at once by a bleeding.

habitual enjoyment of good health, felt, since the 19th of April, pains which moved alternately from one joint to another, but which were principally seated in the wrist of the right hand, the two knees, and the tibio-tarsal articulation of the left side. Having entered the La Charité on the evening of the 23d April, 1822, he was, on the 24th, in the following state :—

Intense anxiety ; eyes heavy ; the right wrist and knee of the same side slightly swollen ; the slightest motion of these parts caused the most excruciating pain ; the left knee and the parts around the ankles were also painful, but not swollen ; pulse frequent and full ; skin hot, and a little moist ; tongue white ; thirst moderate ; constipation. Venesection to the amount of four palettes, &c.) A copious sweat took place in the evening.

On the 25th, the patient was nearly in the same state. The blood drawn on the preceding day presented a broad coagulum, of but little consistence, and not buffed. The continuance of the pains, and the intensity of the general reaction, induced M. Lerminier to prescribe a second bleeding to the amount of three palettes. A little time after it was drawn, the blood presented a dense small coagulum with elevated edges, covered with a thick buff, and surrounded by a copious greenish serum. Thus there was a perceptible difference between the blood drawn the first and second time, though in both cases the vein had been opened in the same way.

The patient took, in the evening, twelve grains of Dover's powder in two doses. He perspired very much a great part of the night.

The next day the joints were no longer swollen, they were scarcely painful ; but the patient complained, for the first time, of wandering pains in the thoracic parietes ; the respiration was hurried ; the fever still continued. He was bled a third time ; the blood presented the same characters as that drawn the second time.

All the day the patient complained very much ; the thoracic pains were now concentrated in the epigastrium and lower part of the sternum. In the night great restlessness, total want of sleep ; no perspiration.

On the 27th, all the symptoms were exasperated. The inspiratory movements, short and frequent, were performed at once by the elevation of the ribs and the depression of the diaphragm. The patient uttered constant complaints ; he said that he felt an acute pain in the epigastrium, which the least pressure increased, and which extended to the lower part of the sternum, and to the precordial region. The pains of the limbs entirely disappeared. Still the patient had no cough ; the chest, when struck, sounded well everywhere ; everywhere also the respiration was strong, but clear ; pulse very frequent, regular, and remarkably hard, whilst the beating of the heart was heard everywhere with the stethoscope, but very feebly ; the ear applied immediately over the region of the heart distinguished merely a confused murmur, which did not allow one to recognise the pulsations of either the ventricles or the auricles. This group of symptoms, and at the same time the absence of every sign of an inflammation of the pleuræ, or of the lungs, inclined us to suspect the existence of a pericarditis. Forty leeches were applied to the precordial region, and a few hours after the epigastrium was covered with a blister.

The patient found himself considerably relieved in the course of the day ; but in the evening there was a return of the symptoms, great fever, considerable dyspnœa, a threatening of suffocation. He was instantly bled to a large amount ; the blood hardly began to flow, when the respiration became freer : the same appearance of the blood as in the two previous bleedings.

On the morning of the 28th, the state of the patient was very much improved ; the respiration was more calm ; the pulse less frequent, and of almost the natural strength ; the pain of the epigastrium and of the precordial region was gone.

On the 29th, the respiration again became very much embarrassed ; pulse recovered its great frequency and hardness ; a sort of a tumultuous, indefinable

murmur was heard in the region of the heart. By means of percussion a duller sound was heard here than on the preceding days; the pain of the epigastrium and of the precordial region reappeared. The several bleedings having produced each time a visible amelioration, recourse was had to them again. (Three palettes of blood were again taken; twelve leeches applied to the region of the heart.) The blister to the epigastrium, which was now dry, was replaced by two blisters to the legs.

On the 30th, the respiration, which was still accelerated, was less difficult than on the preceding day. The patient no longer felt any pain; his countenance was considerably calmer and more natural; pulse retained its strength; the blood presented an appearance similar to that on the former occasions. (Fifteen leeches to the region of the heart.)

The same state continued during the day. At eight o'clock at night the patient was calm; his countenance not altered; his respiration appeared tolerably free; he spoke with ease, sat up without much difficulty, and suffered no pain. He died suddenly at eleven o'clock at night.

The body was examined nine hours after death.

Neither the brain nor its membranes presented any appreciable lesion. Each of the lateral ventricles contained two or three small spoonsful of limpid serum.

The lungs were healthy; the cavity of the pericardium contained somewhat more than half a litre of turbid serum; the portions of serous membrane covering the heart, and that lining the fibrous fold, were covered through their entire extent by a false membrane, which, being marked with numerous asperities, presented an appearance somewhat similar to that of the second stomach of ruminant animals, known by the name of *paunch* (*panse*).

This species of mamillated false membrane was already noticed by Corvisart and Laennec, as a particular form of pseudo-membrane, which these great observers never met but in the pericardium. Along the furrow which marks the place of union of the two ventricles, as also at the apex of the heart, albuminous, membraniform concretions existed, such as those usually found in inflamed serous membranes. In two or three points we found extended, from one of the surfaces of the serous membrane to the other, long whitish bands, very soft, and which were torn by the slightest force. The tissue of the heart was very pale; its cavities contained fibrinous clots partly deprived of colouring matter, which extended into the vessels.

Remarks.—Here again, as in the preceding case, the inflammation of the pericardium appeared to arise at the same time that the rheumatic affection of the limbs disappeared. The pain, which marked the attack of pericarditis, was at first wandering, and not considerable; perhaps too, at its outset, it was not occasioned by the disease of the pericardium. The rheumatism commenced in some degree by attacking the thoracic parietes, where wandering pains indicated its presence; then these pains became more acute, and occupied successively the epigastrium, base of the sternum, and the precordial region; though very acute, they never were so severe as in the patient who forms the subject of the preceding case. In that person they ceased only with life; in the negro, on the contrary, they were not continued, and that was another feature of resemblance with the rheumatic affection. Several times during the course of the disease we observed the dyspnœa and general anxiety to disappear with the pain. What was very extraordinary, death did not supervene in the midst of an increase of the pain, or during an attack of dyspnœa; it occurred when there was now a visible improvement, and when the disease seemed beginning to progress towards a resolution. The pulse, different from that presented by the patient in the first case, was constantly full, hard, and regular; the pulsations of the heart were at the same time very obscure. This is just the reverse of what is observed in other circumstances, where the lesion of the pericardium is

however still the same: but the heart is otherwise irritated, and the nervous system otherwise influenced.

Case 3.—Pain in the region of the heart, radiating at intervals to the left arm—Beatings of the heart very strong at the outset, but subsequently very obscure; pulse all through very small and regular—Sound dull in the precordial region—Great dyspnœa—Effusion of blood into the pericardium.

A shoemaker, thirty-one years of age, was admitted into the La Charité, the 6th of November, 1821. On the 4th of the same month, he had been seized with a shivering and general illness; on the night of the 4th, he had, he said, considerable fever. On the morning of the 5th, he felt an acute pain on the level of, and anterior to, the left breast. This continued on the 6th. On the 7th, he presented the following state:—Countenance pale, and expressive of suffering and anxiety; risus sardonicus from time to time, a convulsive trembling of the lips. The pain of the precordial region was not very intense; but it increased from time to time, became much more severe, and then was not confined to the region of the heart; it spread over all the left side of the thorax; at the same time, all the upper extremity of this same side became the seat of well-marked numbness, which was sometimes succeeded by an acute pain, which lasted only for some moments, and which was seated principally in the anterior surface of the arm and fore-arm, Every time the pain thus became more acute the respiration became at once very difficult; the pulsations of the heart became very tumultuous and extremely irregular; the pulse was no longer perceptible; an icy coldness spread over the extremities. On the pain again diminishing, the respiration presented merely a slight difficulty, the pulsations of the heart retained their strength; they were heard over the entire extent of the anterior part of the thorax; but they recovered some regularity, and the pulse rose a little, though it always continued very small compared with the strength of the heart's pulsations. The patient coughed a little; the chest, however, was everywhere sonorous, and the respiratory murmur was heard everywhere with strength and clearness. This aggregate of symptoms presented several traits of resemblance to those which have been considered as belonging to angina pectoris. They were referred to an inflammation of the pericardium. (Venesection to sixteen ounces; thirty leeches to the precordial region; sinapisms around the knees.)

After the bleeding and the application of the leeches, the paroxysms of pain became less severe and less frequent; the night was passed better than those preceding it.

On the morning of the 8th, the patient complained of a feeling of tightness rather than a real pain in the region of the heart. The pulsations of the heart not so strong, the pulse always very small and of great frequency. The breathing was but little embarrassed. In the course of the day the pain of the heart again reappeared with violence three or four times, and each time it extended to all the left side of the thorax, with marked numbness of the arm, forearm, and hand of this side. In the night, he was bled to twelve ounces. On the right his state nearly the same.

On the 10th November, the sixth day of the disease, new symptoms appeared; the pain no longer existed; the countenance recovered a more natural appearance; the pulsations of the heart were less strong and less extended; the pulse still very small. Some hours after the visit, without any reappearance of the pain, the patient was seized all at once with great dyspnœa, which went on increasing till the following morning. Then, on examining the region of the heart with the stethoscope, we were not a little astonished at no longer hearing its pulsations, which were till then so strong, except in a very obscure manner; the pulse was smaller than ever; the chest was percussed again, and for the

first time we discovered on the left side the existence of a very dull sound from above downwards, from the level of the fourth rib to that of the ninth or tenth, and transversely from the breast nearly to all the left half of the sternum inclusive. Lying down in the horizontal position was now become impossible; the patient being placed sitting up, could scarcely pronounce a few words with a panting breath; he said he felt as if an iron chain was violently compressing his chest, and choking him. (Two blisters to the thighs.) In the course of the day, the oppression became more and more considerable, and the patient died in the night.

Post-mortem.—The parietes of the thorax were scarcely raised, when we saw to project before the heart and lungs an enormous sac which compressed the latter, and which proved to be the pericardium distended by nearly a litre of a brownish red liquid, similar to blood flowing from a vein. The inner surface of the pericardium was also lined with membranous concretions of a red colour; lungs very much engorged with blood, as was also the liver; well-marked venous injection of the intestinal canal, visible serous infiltration of the subarachnoid cellular tissue of the convexity of the cerebral hemispheres; white substance of the brain presented a considerable number of red points.

Remarks.—This case presents other symptoms different from the two cases preceding it. These symptoms may be divided into two series, with respect to the organic change which seems to have given rise to them. In the first series we shall arrange those presented by the patient from the commencement of the pericarditis up to the ninth day. These symptoms depend on a lesion of the pericardium, similar to that which existed in the two preceding cases; and still these symptoms were no longer those merely noticed in Cases 1 and 2. Here again, indeed, we find anomalies both in the beating of the heart and in the pulse; but these anomalies are not precisely the same: the pulse, for instance, is small, as in the first case, and regular, as in the second. We find that there is pain; but this pain has very remarkable characters; it becomes acute only at intervals; being almost entirely intermittent, and radiating far from the place of its origin, it might be taken for the consequence of a neurosis.*

On the ninth day and the beginning of the tenth, a perceptible amendment took place; but all at once a new disease recommences, or rather the pericarditis, which seemed progressing towards a resolution, assumes a new character; then it is no longer a small quantity of purulent matter, of coagulable lymph, which, under the influence of the inflammatory process, is secreted by the pericardium; it becomes the seat of an abundant and sudden hemorrhage: in a few hours its cavity is filled and distended with an enormous quantity of blood; from thenceforth there is constantly increasing difficulty in the motions of the heart, and compression of the lungs; death by asphyxia. How different the symptoms would have been, if the effusion had taken place gradually, of which we shall presently see some instances.

* These same symptoms are produced, in fact, in several cases, in which they can be referred only to an affection purely nervous. We have seen at the La Charité a young woman who, from time to time, felt an acute pain in the region of the heart; from this region the pain radiated to different points of the thorax, and down the arms. The latter were often affected with a numbness, which sometimes proceeded as far as complete paralysis: the patient felt at intervals violent palpitations, during which the pulse became thready. These different symptoms, however, disappeared after having lasted from some minutes up to twenty-four or thirty hours; during the intervals between them, nothing unusual was observed in the circulatory apparatus. These symptoms were often succeeded by other nervous phenomena, such as convulsive movements, partial or general, alternations of exaltation and abolition of sensibility, symptoms of chorea. In the midst of these different functional disturbances, why not recognise one and the same disease, the symptoms of which may vary with the seat, but the nature of which remains identical? I would have no hesitation in saying that this woman had from time to time *chorea of the heart.*

Case 4.—Symptoms of pericarditis—Cure.

A stonecutter, 39 years of age, was ill for ten days, when he entered the hospital the beginning of May, 1823. He had first some signs of cerebral congestion, then there was some fever, and for the last four days he complained of an acute pain below the xiphoid cartilage. He was bled on the day of his admission. The headach and dizziness diminished after the bleeding; but the pain in the epigastrium became more acute, and extended to the space between the breast and sternum. The application of twenty-four leeches to the epigastrium gave no relief, and on the 9th of May, the symptoms were very serious; he complained of intolerable pain in the precordial region; that of the epigastrium was considerably diminished; the latter was not increased either by pressure or by inspiration; the patient thought it less when he lay on the back, than on either side; the beatings of the heart, which were calm and regular the day before, were now become irregular and tumultuous; the pulse was also very irregular, frequent, and of ordinary strength. No symptom indicated any affection of the lung or the pleuræ; whence we were induced to suspect a pericarditis: this was met by another bleeding of twelve ounces, and the application of forty leeches to the precordial region. The next day the alarming symptoms partly disappeared: the patient complained merely of slight pain in the region of the heart; the beatings of the heart, as well as the pulse, had lost their great irregularity; still there was some fever, and the breathing was not yet free. It was evident that the inflammation of the pericardium had been arrested in its progress, but it still continued. To adopt an expectant treatment was to run the risk of seeing the inflammation, which was only stopped, become again lighted up, and proceed with new activity, or else, a thing not less dangerous, pass into the chronic state. Thoroughly convinced that there was in this case only an amendment of the symptoms, and that the disease was only suspended, but not entirely removed, as was proved by the symptoms which still remained, M. Lerminier recommenced the same line of treatment which on the preceding day appeared so efficacious; the same quantity of blood was taken; the same number of leeches were applied, and a large blister was placed on the anterior of each thigh. In the twenty-four hours following, the patient became better and better, and on the 12th of May, he was completely convalescent, and soon left the hospital perfectly restored.

Remarks. — Though it is not quite certain, yet it is very probable, that this was a case of pericarditis checked by a very active antiphlogistic treatment. The bleedings resorted to the day following the improvement of the 10th of May, were perhaps as useful as those employed on the 9th; they completed the good effects of the former. Too often an acute inflammation terminates unfavourably, less because it was not combated when its symptoms were very evident, than because it is too soon considered to be altogether removed. Persons have no notion that the morbid process, which is going on in an inflamed organ, still oftentimes continues after its most prominent symptoms have disappeared; it is then, however, that the physician should redouble his attention, and that his task becomes more difficult: he should then interrogate every the least symptom, and not give over combating the enemy as long as he gives the slightest indication of his presence. How many inflammations thus lying dormant for some days, and considered as terminated, have all at once awakened and ended in death? How many states called states of convalescence are but the passage from the acute to the chronic stage of the inflammation?

The commencement of the disease is also deserving of attention. This is one of those cases so frequently occurring in the practice of medicine, where several organs appear to be simultaneously or by turns the seat of sanguineous

congestions, without any of them appearing to be actually inflamed.* Oftentimes the individual returns to health, after congestions of this description have thus traversed most of the organs, without the affection of any of them having been predominant; this is what several athors have called *general illness* (*maladie générale*), a very vague term signifying nothing else, when applied to the solids, than the simultaneous affection of several tissues, organs, or sets of organs. At other times it happens that after the disease has been thus *general*,† in the sense just now explained, the affection of some one organ becomes predominant; this was the second stage observed in our patient.

In the several cases now cited the pericarditis was announced by a group of symptoms which rendered its diagnosis sufficiently easy; we shall now give some cases in which the most prominent of these symptoms, the pain, no longer existing, it is, in some measure, only negatively or by the process of remotion, that we can recognise the inflammation of the pericardium.

ARTICLE II.

CASES OF ACUTE PERICARDITIS WITHOUT PAIN, BUT WITH DYSPNŒA.

Case 5.—Pulmonary tubercles—Breathing very little embarrassed—All at once great dyspnœa—Sudden death—Purulent effusion into the pericardium.

A shoemaker, 28 years of age, troubled with a cough for the last 22 months, and having expectorated a considerable quantity for the first time, fifteen days before entering the hospital, presented all the symptoms of pulmonary phthisis now in an advanced stage, when we saw him the beginning of June, 1824. Breathing quite free. Heart when examined presented nothing remarkable; some gargouillement was heard at the summit of both lungs; appetite good; stools regular. No new symptom up to the 17th of June, except a little diarrhœa, and great loss of appetite. On the 17th of June, the patient had a greater appearance of suffering than usual; his features were very much altered; he complained for the first time of his breathing being embarrassed; in fact he spoke with a sort of panting voice, and the respiratory movements were perceptibly hurried; pulse was small and very frequent. On the 18th, his state was the same. Did not these new symptoms depend on the presence of a pneumonia, which, in consequence either of its seat, or the preceding state of the lungs, escaped detection by the stethoscope? (Bleeding to eight ounces.) The blood drawn from the vein presented a thin, greenish coat. On the 19th and 20th, the oppression became still greater; M. Lerminier compared the state of the patient to that presented by phthisical patients, who labour at the same time under organic disease of the heart. Face somewhat swollen, eyelids a little infiltrated, lips swelled and of a purple colour. Pulse very frequent, and somewhat irregular in the strength of its beats; from time to time, nearly every fifteen pulsations, it presented a well-marked intermission. The heart was heard without any impulsion and to rather a small extent. The extreme fre-

* I have endeavoured to show in another work (*Precis d'Anatomie Pathologique*) that it is impossible to draw a well-marked line of demarcation between sanguineous congestion, or *hyperemia*, and what is called *inflammation*.

† In the present state of science we have still, however, need of this term to aid us in connecting with their true cause those common morbid states in which there occur, simultaneously or successively, a great number of disturbances, organic or functional, the common tie of which seems to be a lesion of the innervation or of hæmatosis. In such cases there is, no doubt, a starting point, but how are we to assign the limits of the disease? Does it not exist in every part where there are blood and nerves?

quency of its pulsations prevented them from being severally distinguished; they presented also the same intermissions as those of the artery. (Blisters to the legs.) On the 21st, the irregularity and intermission of the pulse still more marked. On the 22d, orthopnœa; commencement of the tracheal râle. He died in the evening.

Post-mortem. — Tubercular excavations in the upper lobe of the two lungs; miliary tubercles in the other lobes. From the symptoms it was probable that we should find some disease of the heart. The substance of this organ presented merely slight hypertrophy of the left ventricle; but in the pericardium there was found a sero-purulent effusion, with membranous concretions on its parietes. There was besides considerable injection of the mucous membrane of the stomach, and some redness, without ulceration, in the large intestine, which was very contracted.

Remarks. — Here was a case of pericarditis very different from the preceding in several respects. First the outset was marked by symptoms much less serious; nothing was observed but an unusual embarrassment in the breathing. There was throughout total absence of pain. However, on some days all the symptoms which indicate aneurism of the heart manifested themselves: but this aneurism could not have formed all at once; how then should it have given no sign of its existence from the time of the patient's admission up to the 17th of June? Up to this day the pulse in particular was very regular. The autopsy showed that the symptoms observed from the 17th June, did not depend on aneurism, but on pericarditis. This fact proves, then, that there are certain forms of inflammation of the pericardium, which influence the motions of the heart so as to give rise to a disturbance of the circulation, which produces the same phenomena as those observed at a certain period of aneurism of the heart.

Case 6.—Slight asthma for several years—All at once extreme dyspnœa, the constant increase of which causes death by asphyxia—Serous effusion into the pericardium.

A tailor, twenty years of age, habitually enjoyed good health, for he did not consider as a morbid state, the slight difficulty of breathing which he felt for several years back whenever he ascended a height or ran. He had lately spent several nights at work. For some days he had cough, when on the 2d of March 1820, without any known cause, he was seized all at once with great dyspnœa; the same night he was bled. The 3d and 4th there was an increase of the oppression. He entered the La Charité on the evening of the 5th, and was bled again; on the 6th, face puffed and livid; lips violet; lies on his back with the neck tense, and the head retroverted. Sixty-five inspirations per minute; they are performed at once by the elevation of the ribs and depression of the diaphragm. The respiratory murmur was heard everywhere with strength and distinctness, except towards the inferior angle of the scapula of the right side, where a little mucous râle was heard, owing to the bronchitis which existed for some days back. The chest, when percussed, sounded well everywhere, except at the region of the heart, where the sound was dull. No thoracic pain either had been or was at present felt by the patient; his expectoration was purely catarrhal. The beats of the heart, which were regular, were heard with a slight impulsion in the precordial region: the hand, when applied over this region, recognised merely a sort of vague murmur (*bruissement*), where percussion detected the dull sound. The pulse was regular, but hard and vibrating, and its frequency was proportioned to that of the inspirations: the skin was hot and dry.

What was the cause of the asphyxia in the case of this patient? It seemed neither to reside in the pleuræ, nor in the pulmonary parenchyma, nor in the bronchi. By thus reasoning we came to suspect the existence of an affection

of the pericardium. The dull sound at the region of the heart, the bruissement found on the application of the hand over this region, indicated even an effusion into this membranous sac. (A third bleeding; thirty leeches to the epigastrium: in the night sinapisms to the legs.) In the evening the patient had a general and a very copious perspiration; but it gave no relief. On the morning of the 7th, suffocation still more and more imminent; continuance of the hardness of the pulse. (Blisters to the thighs; purgative lavement.) He died in the night, five days after the commencement of the dyspnœa.

Post-mortem fourteen hours after death. — The pericardium, when viewed externally, presented considerable distension; it contained nearly a litre of limpid colourless serum, in the midst of which small albuminous flocculi floated. The inner surface of the pericardium presented no inflammatory appearance. The parietes of the left ventricle of the heart were but slightly hypertrophied. The bronchi in general were red, the pulmonary parenchyma infarcted, the liver engorged with blood, and the digestive canal injected.

Remarks. — With respect to the great quantity of liquid effused into the pericardium, this case bears some resemblance to Case 3; but in the latter the effusion was formed by blood; in the present case it consisted of nearly pure serum, which seemed rather the result of simple active exhalation, than of inflammation properly so called. But who can assign the precise limits which strictly separate these two affections, which in several cases at least appear but different forms of one and the same primary phenomenon? Be that as it may, the existence of this effusion was indicated by the dull sound and the peculiar bruissement discovered by the hand when applied over the region of the heart. Besides, the beats of the heart, as well as the pulse, preserved great regularity; the pulse continued hard and vibrating. Here are phenomena different from those observed in Case 5; and yet in the two cases there was one and the same state of hypertrophy of the heart. It might be said that here the pulse remained under the influence of this hypertrophy, whilst in Case 5, it was modified by the pericarditis. Here, again, there was total absence of pain: is it because there was here but hydro-pericardium? But in Case 5, it was pus that was contained in the envelope of the heart, and the pericarditis was equally free from pain. Before terminating these reflections, we shall remark, as an accessory circumstance, the slight commencement of asthma observed in this individual, and which was attributable to simple hypertrophy of the left ventricle of the heart, without any obstacle to the orifices, and without any affection in the right side of the heart.

Case 7.—Confluent small-pox—Complication of pericarditis, announced merely by great dyspnœa.

A young man, seventeen years old, entered the La Charité during the year 1818, on the third day of the eruption of a well-marked small-pox. The pustules were everywhere very numerous. The symptoms were in other respects very mild up to the 7th day, the eruption proceeded very well, no complication interfering with it; but at the time the pustules began to be in a perfect state of suppuration, the respiration suddenly became embarrassed, without there being either cough or bloody expectoration. The two following days the eruption became stationary; several of the pustules became black; others became filled with a reddish serum; livid petechiæ appeared in the intervals between them; the patient fell rapidly into the last degree of prostration, though the tongue continued moist and whitish; the dyspnœa went on increasing, and death took place the beginning of the 10th day.

Post-mortem. — The only lesions found were a sero-purulent effusion into the pericardium, and a considerable injection of the mucous membrane of the stomach.

Remarks.—This case, which is incomplete with respect to the description of several symptoms, and in particular those furnished by the heart and pulse, is not devoid of interest, by reason of the species of complication of which it affords an instance. We have here an example of what is called malignant small-pox, the alarming symptoms and fatal termination of which may be explained by the complication of an internal inflammation. When this inflammation is a meningitis, a pneumonia, a pleuritis, a gastro-enterite, the diagnosis is always sufficiently easy, and the judicious employment of the antiphlogistic treatment then presents many chances of success. But here, what symptom could reveal the nature of the internal lesion? The bad aspect which the eruption assumed all at once, the petechiæ which appeared, the sudden prostration of strength, and a remarkable dyspnœa, such were the morbid phenomena, the cause of which was to be ascertained. With the ancients these phenomena would have commenced the existence of what they call putrid or malignant small-pox. No doubt, in fact, but that in consequence probably of the disturbance occasioned to the nervous system by the affection of the skin, there are observed during the course of certain cases of small-pox, extraordinary and irregular symptoms, the cause of which pathological anatomy does not reveal. This happens not only in small-pox but in all the acute cutaneous exanthemata. Some months since we examined the body of a woman, who, at the commencement of an eruption of measles, was seized with a slight delirium, and died unexpectedly, without any alarming symptom having announced this fatal symptom some hours before death. The examination of the body, which was conducted with the utmost care, presented all the organs in a sound state, except the bronchi, which were very much injected (as must take place in all cases of measles). In our patient, as in this woman, there was merely a disturbance or perversion of the functions of the nervous system; and could either the dyspnœa, or the change in the appearance of the eruption, be referred to the morbid modification of the innervation? That which seemed at least very certain, is, that the extreme prostration, into which the patient fell suddenly, succeeded the very satisfactory state of the strength too rapidly to be considered as real. Did it depend on any internal inflammation? We were very much disposed to admit it, though we could not point out its seat. The dyspnœa seemed, however, to indicate some lesion of the organs of respiration or of circulation. The *post-mortem* examination showed the cause of it to reside in an inflammation of the pericardium. A very striking example, no doubt, of the obscurity of the diagnosis in this disease, of the influence it may exercise over the variolic eruption, and lastly of the great prostration which it may suddenly produce.

In the case just now cited, the dyspnœa is the only sign remaining, capable of announcing that there is an affection of the thoracic organs; by proceeding on the process of exclusion, as we have already stated, we may again, in this case, go so far as to recognise, or at least to suspect, the existence of a pericarditis. But there are cases still more obscure, in which there is no longer even a perceptible difficulty of breathing, and where, though the affection is seated in the thorax, there is no symptom indicating such a seat. We shall cite a case of this kind, observed at the La Charité; we shall then annex another of a similar nature, contained in the work of M. Rostan, on *Softening of the Brain.*

ARTICLE III.

CASES OF ACUTE PERICARDITIS WITHOUT ANY CHARACTERISTIC SYMPTOM.

Case 8.—Symptoms of meningitis—Acute inflammation of the pericardium.

A woman, twenty-six years of age, the mother of two children, and who

recently had had a miscarriage, entered the La Charité in the beginning of the year 1820, in such a state of delirium, that no information could be obtained regarding her previous history. This delirium was remarkable for the obstinate silence which accompanied it; when interrogated, she fixed her eyes steadfastly without answering; countenance pale; her lips, separated from each other, and agitated from time to time by a convulsive tremor, allowed us to see the tongue, which was moist and white. The pulse was frequent and small, but in other respects regular; skin not very hot. (Leeches behind the ears.) The two following days there was frequent retroversion of the head, sudden rising of the trunk at intervals, subsultus tendinum; the patient speaks and seems to understand, but what she says is incoherent. Countenance still pale; pulse, which is very frequent, intermits. On the 4th day of her admission the delirium was gone; she complained only of great debility; the muscles of the face were agitated by convulsive movements, which were nearly constant; the upper extremities presented from time to time a sort of tetanic rigidity. On the 5th day the delirium returned; the features became immoveable and quite altered; the upper extremities, when raised, fell back by their own weight, as if they were paralysed; in the course of the day the patient fell into a state of coma, and died in the night.

Post-mortem. Slight injection of the mucous membrane of the digestive canal in some points. Infarction of the posterior part of the lungs. The pericardium was lined interiorly with albuminous concretions, some of which extended like bands, still soft, from one of its surfaces to the other; some ounces of a greenish flocculent serum were also found effused.

Remarks. — In this patient, the seat of all the symptoms resided evidently in the nervous centres. But were the latter idiopathically affected? or were they but sympathetically so? and was not the origin and true cause of the disease in the inflammation of the pericardium?

The case published by M. Rostan, as well as that now recorded, presents certain cerebral symptoms, for the explanation of which no other lesion is found than a pericarditis; notwithstanding the obscurity and unusual form of its symptoms, this inflammation was diagnosed by M. Rostan. Here is a summary of the case: A woman, after two days' general illness, fell all at once into a profound loss of consciousness.

The next day, eyes fixed, eyelids open, face flushed; almost absolute immobility of the limbs, which ceased, however, when they were pinched. Pulse scarcely perceptible, no more than the beats of the heart. Death on the fourth day. Bloody serum in the pericardium, with false membrane on its surface.*

The fact contained in the 8th case, and that recorded by M. Rostan, are well calculated to prove that, in proportion to individual susceptibilities, there is no organ whose lesion may not give rise to nervous symptoms the most varied, so as to produce sympathetically the different morbid states, the seat of which is placed in the nervous centres and their appendages. It has been truly stated that the inflamed digestive canal, more frequently than any other organ, reacts upon the brain, and gives rise to the symptoms of an arachnitis or an encephalitis. But it is no less true, as M. Boisseau in particular has clearly shown, that inflammations of the other organs, by their sympathetic influence on the brain, may also occasion the different groups of symptoms which constitute what is called ataxic fever.†

* Rostan, *Recherches sur le Ramollissement du Cerveau*, page 233.

† The cases now cited may give an idea of the great variety of the symptoms which accompany acute pericarditis. In one and the same subject there may be found combined an acute pain in the region of the heart, a dull sound in this same region, considerable dyspnœa, great acceleration in the beats of the heart and pulse, remarkable irregularity in these beats, unusual strength in those of the heart, whilst those of the artery are, on the contrary, very weak;

CHAPTER II.

OBSERVATIONS ON CHRONIC PERICARDITIS.

4. We have seen in the preceding article, how variable, and oftentimes obscure, were the symptoms of acute inflammation of the pericardium. Its chronic inflammation presents itself, in certain cases, under such a form, that it gives rise to most of the general symptoms which characterise an organic affection of the heart, and particularly to dropsy. The following cases will illustrate these observations: —

Case 9.—Very thick false membranes around the heart—Symptoms of aneurism.

A mason, twenty-five years of age, enjoyed good health up to the middle of December, 1823; he then caught cold, which became more and more distressing. In January, 1824, he began to feel a little dyspnœa; the lower extremities, and then the abdomen, became swollen. Having entered the La Charité towards the month of February, 1824, he presented the following state: —

Livid hue of the countenance; lips of a violet colour; infiltration of the lower extremities; ascites. The respiration short and hurried. Some mucous râle audible in different points of the thorax; the chest when percussed sounded well everywhere; cough frequent, with mucous expectoration; the beats of the heart presented nothing unusual with respect to their strength and their extent; but they were intermittent, as were also the arterial pulsations, which were at the same time remarkably small. The patient never felt any pain in the precordial region. Tongue natural; appetite good; taking food into the stomach soon followed by an increase in the dyspnœa. Diarrhœa for the last three months. The urine, small in quantity, is characterised by a reddish deposit. Skin constantly dry.

The existence of an organic affection of the heart must here be naturally suspected; the intermissions of the pulse seemed to announce some obstacle at the origin of the aorta, a disease of the valves, connected probably with dilatation of the cavities of the heart; this was, in fact, what we found in other patients who presented the same group of symptoms, whether local or general. (Blisters to the legs; frictions with a mixture of squill wine and camphorated spirit; juniper fumigations, with diuretic drinks.)

On the following days, urine more copious and clear; breathing freer; dropsical effusion lessened.

syncope; at the same time there exists no sign of disease of the lung or pleuræ; in such a case there is no difficulty in the diagnosis. But most of these symptoms may be wanting, or present themselves separated from each other. Thus there are some cases of acute pericarditis, which are accompanied by no pain, or which are marked by a very slightly marked pain, either seated in some place different from the region of the heart, or intermittent. There are other cases of pericarditis in which the beats of the heart are neither stronger nor weaker than in the ordinary state; they are more or less frequent. The pulse, oftentimes remarkable for its extreme smallness, presents at other times an unusual hardness; irregular in some, it presents in others its normal rhythm. The dulness of sound may be wanting, since it depends on the effusion which has taken place into the pericardium, and since death may supervene, or a cure be effected before the effusion has taken place. With respect to the dyspnœa, it is sometimes the only symptom produced by the pericarditis; but this dyspnœa may itself be wanting; and in some cases, where up to the period of death the respiration had remained perfectly free, where no pain was felt in the precordial region, a pericarditis has been found with production of recent false membranes, or effusion of pus. There are, in fine, other cases, where signs of pneumonia or pleuritis coincide with this dyspnœa; and if no pain exists in the region of the heart, there no longer remains any sign to detect the pericarditis, but the dulness of sound in this region. But this sign, besides that it may be wanting, again loses much of its value, if there exists at the same time on the left side a pleuritic effusion, or a pneumonia.

On the 5th of March, the state of the patient became worse without any known cause : the right hand was puffed for the first time ; the embarrassment of the respiration renders it impossible to lie in the horizontal position, and the patient is obliged to be half sitting up in the bed. Pulse very small and irregular ; the diarrhœa continues without any pain. (Two more blisters to the thighs.)

For the five days following, the patient did not become worse, he presented no new symptom. Died suddenly on the 10th of March.

Post-mortem. The two folds of the pericardium adhered closely throughout their whole extent. Their mode of union was by membraniform layers more than an inch in thickness, which envelope the heart in a sort of shell. They had the solidity of fibrin which has remained for a long time deposited in aneurismal sacs ; they are moreover of the same colour as it, being pale and white externally, becoming reddish near the heart, and then resembling flesh. The inner surface of the stomach covered with red points. Through its entire length the intestine was injected ; the mucous membrane of the large intestine was softened. The liver and spleen were gorged with blood, as were also the abdominal veins ; old cellular adhesions united the liver and diaphragm. The encephalon and its appendages presented a paleness of colour which contrasted very strongly with the general injection of the other organs. The ventricles contained but very little serum.

Remarks. — What symptom was there in this patient indicating chronic pericarditis. This inflammation seemed to commence here imperceptibly ; no pain marked its invasion. On the other hand, the progress of the disease, the symptoms which existed, and in particular the mode of breathing, the infiltration of the limbs, the ascites, the intermittent state of the pulse, all seemed to announce an organic affection of the heart. Neither the application of the hand over the precordial region, nor auscultation, discovered anything more than irregularity in the heart's action. But we shall see hereafter, that in several cases of organic affections of the heart, no local sign reveals their existence. Here, however, the substance of the heart itself was not diseased ; but it seemed that this organ had been, as it were, compressed and embarrassed in its movements by the thick and solid envelope which surrounded it on all sides : thence, embarrassments in the pulmonary circulation, and consequently dyspnœa ; thence, also, an obstacle to the free return of blood of the venæ cavæ, and in consequence thereof of dropsy. Thus, then, all the phenomena resulting from an aneurism of the heart were here produced by false membranes developed around this organ.

Case 10.—Very thick pseudo-membranes around the heart—Dropsy—Extreme frequency of the pulse—Pericarditis recognised during life.

A man, of nearly the same age as the preceding, had always enjoyed good health, when, during the month of April, 1825, he felt all at once violent palpitations of the heart, with dyspnœa and fever. He was admitted into the Hôtel-Dieu, and bled there several times, and under the treatment there adopted, the difficulty of breathing was considerably diminished, which induced the patient, who now felt himself much relieved, to quit the hospital. Some time after he entered La Charité. He did not then complain of palpitation : he could lie in any position ; the hand and ear applied over the precordial region recognised nothing but extreme frequency in the beats of the heart. The respiratory murmur was heard generally with clearness and strength. The pulse, which was regular and of the ordinary strength, *was more than* 140 ; the temperature of the skin was not increased ; there was no fever, properly speaking. The lower extremities were beginning to be infiltrated.

The most prominent morbid phenomenon presented by this patient was the extreme frequency of the pulse. This sign, added to the consideration of the progress of the disease, and of the other symptoms, induced us to suspect the existence of a pericarditis, though there never had been any pain in the precordial region. Bloodletting seemed to be no longer indicated. M. Lerminier prescribed blisters to the legs, diuretic mixture, and pills of digitalis. No benefit resulted from this treatment, and in consequence of vomiting having come on, the digitalis was given up. The infiltration of the lower extremities went on increasing, and the abdomen also soon began to become enlarged; then infiltration of the face commenced; the respiration, till then quite free, became embarrassed, and the patient's voice was panting, as in organic affections of the heart; the frequency of the pulse was always the same; the ascites increased. Such was the unfavourable state of this patient, when one day, on percussing the thorax, we detected the existence of a very dull sound on all the posterior part of the left side of the chest; all over this space there was total absence of the respiratory murmur, without the resonance of the voice being otherwise modified. Thus, for some days back, without any pain, without any perceptible change in the state of the patient, the left pleura seemed to have become the seat of an effusion. From this period the strength of the patient seemed to sink rapidly; his features were altered; severe diarrhœa came on, and he died after a few days.

Post-mortem. Adhesion of the two folds of the pericardium; false membranes around the heart, forming for it, as in the preceding case, an envelope of more than an inch in thickness; in the midst of them were small whitish masses of an irregular form; some, which were still liquid, resembled pus; others, more solid and friable, had somewhat of the appearance of tubercles. The heart itself was exempt from any lesion. The left pleura was filled with a sero-purulent fluid. The pleura costalis, and pulmonalis of the right side were united by false membranes, which contained numerous tubercles similar to those of the pericardium. An abundance of serum effused into the peritoneum; a great number of red patches on the internal surface of the cæcum and of three-fourths of the colon.

Remarks. — There are two distinct periods to be remarked in this patient's case. First, the inflammation of the pericardium, at its commencement, produced no other phenomena than those resulting from sympathetic irritation of the heart: thence the violent palpitations and the dyspnœa. Thus, then, some palpitations may recognise for their cause an affection of the pericardium, However, there was no pain. Subsequently, and under the influence of judicious antiphlogistic treatment, the pericarditis threw off its acute state; then the palpitations ceased; the breathing again became freer. But the disease was not yet removed; it merely passed to the chronic stage, and then commenced the second period: from the increasing thickness of the pseudo-membranes secreted in the sac of the pericardium, there was formed a sort of envelope, which seemed to impede the freedom of the heart's movements; thence appeared several of the symptoms characterising aneurism of this organ. As to local symptoms, there were none; auscultation gave but negative information. But there was observed at the same time, and uniformly, a remarkable phenomenon — namely, extreme frequency of the pulse, which was not diminished even by the digitalis. The pleuritis on the left side, which presented itself towards the latter period, was not, any more than the pericarditis, announced by any pain; it seemed to produce nothing more than an increase of the prostration; it was the latter, in fine, carried to the last degree by the attack of colitis, which, though of trifling consequence under other circumstances, appears to have been here the cause of the patient's death.

If we now compare this patient with the subject of Case 9, we shall find as

traits of resemblance — 1st, one and the same alteration of the pericardium; 2d, the same state of infiltration, and other symptoms usually characterising an organic affection of the heart. But the commencement of the two diseases was not similar; here there was an acute stage, which was wanting in the subject of Case 9. In this latter the pulse approached nearer to the pulse of diseases of the heart; it was regular and intermittent. In the subject of Case 10, the pulse had a frequency seldom found in organic affections of the heart, and which led us to diagnose a pericarditis. Now, the lesion of the pericardium being the same in both individuals, why were the arterial pulsations so different? This comes to the same as asking why, in two individuals, whose meninges were inflamed in the same degree, and in the same part, there was in the one a state of coma, and in the other convulsions. Finally, in the subject of Case 9, death appears attributable to the affection of the pericardium itself; in the subject of Case 10, it was principally the result of the double inflammation of the left pleura and the large intestine.

5. We have now seen two cases in which the chronic pericarditis gave rise to symptoms simulating those of an organic affection of the heart. But it may often exist, however, without producing either these symptoms or any other; so that during life nothing leads us to suspect the existence of an affection of the heart or its appendages, and it is only after death the affection is discovered. It is the same in more than one case, where accidental productions are developed in the pericardium. A lapidary, thirty-three years of age, the history of whose case we shall give elsewhere* more in detail, died of chronic hepatitis, with inflammation of the peritoneum. During life no morbid phenomenon was discovered connected with the thorax. The breathing seemed to be uniformly free; the heart's action appeared to be in its normal state. We found the external wall of the right ventricle surmounted from its apex, nearly to the junction of this ventricle with the auricle, by a rounded irregular tumour, the size of a pullet's egg, interposed between the substance of the heart, which remained intact; and the visceral reflexion of the pericardium, which was raised by it. This tumour consisted of a hard whitish tissue, traversed by some vessels, without any appearance of fibres (encephaloid substance in the state of crudity). No other lesion was presented by the heart or pericardium.

The observations on acute or chronic pericarditis now given, regarded cases in which the inflammation of the enveloping membrane of the heart was general. But there are also cases where the pericarditis remains partial, and occupies a space of only some lines. Then it is not an alarming disease, and it often happens that the individuals so affected do not even keep the bed. As traces of this partial pericarditis, we find on the dead body either circumscribed white spots, which occupy some points of one or other surface of the heart or cellular bands, extending from one of the reflexions of the pericardium to the other; these adhesions are partial, and are most frequently seen towards the apex of the heart. Those circumscribed inflammations of the pericardium seem to me to be at least one of the causes of the more or less acute pains experienced by some persons in the region of the heart. We have known persons who have been tormented with such pains for a very considerable time without being ill in any other respect. Several, however, had palpitations, which reappeared whenever the pain became more acute. It must also be acknowledged that more than once the morbid changes in the pericardium just mentioned have been met, though during life the region of the heart had never been the seat of a pain remarkable either in severity or duration. Thus, among the individuals in whose pleuræ numerous adhesions are found, some have had, at different periods

* Diseases of the Liver.

of their life, pains more or less intense in different points of the thoracic parietes, whilst the others never experienced them.*

* Some excellent observations on pericarditis may be found in Dr. Latham's Essays on Diseases of the Heart, contained in the third volume of the Medical Gazette: we shall take the liberty of citing a few of them. With respect to the symptoms of this affection, the following judicious remarks are made by this accomplished physician: — "In pericarditis a vast difference arises in respect to symptoms, according as the solid or the fluid products of inflammation predominate. It is in consequence of the products of the inflammation consisting chiefly of solid coagulable lymph, and of that lymph quickly producing a complete adhesion of the pericardium, and thus preventing the possibility of fluid being effused into its cavity, that the force and even the regularity of the heart's action, with which the disease began, is continued throughout its whole course, and that there is no absolute necessity of accommodating the trunk of the body to one constrained position."

"On the other hand, it is in consequence of the products of the inflammation consisting chiefly of fluid, whereby adhesion is prevented, and of the fluid continuing to increase, that the heart's action, from being violently excited, becomes soon scarcely perceptible, and fluttering and irregular; and that to swerve from one constrained position is at the peril of instant death."

The length of time during which life may be sustained in pericarditis, will also be considerably influenced by the nature of the products of inflammation. "Where the heart suddenly loses the force and rhythm of its action," (says Dr. Latham, loc. cit.) "and flutters, and falters, and stops, and gasping and fainting follow the least deviation from a given position, the patient will be quickly dead, if, by virtue of your remedies, you do not quickly change the conditions of his disease; and being dead, you will find the heart floating in the fluid which distends the bag of the pericardium. But where the heart still maintains the force and rhythm of its action, without any very urgent necessity of accommodating the body to one position (conditions which are consistent with the most acute inflammation), your patient will not die immediately, although your remedies do not procure the least mitigation of his disease, but he will continue to live probably for some weeks, and will then die, as if he were exhausted by the violent action of his vascular system; and being dead, you will find no fluid in the pericardium, but solid lymph accumulated upon it in quantity proportionate to the duration of the disease."

With a view of our forming some conjecture as to the period when the inflammation of the pericardium ceases, and there is no further deposition of lymph, Dr. L. says: — "When in pericarditis the strong impulse and sonorous contractions of the heart are gradually exchanged for a merely hurried circulation, and the fixed undeviating pain in the heart becomes a more general uneasiness about it, and, at the same time, the peculiar anxiety which has been mentioned is less and less apparent, we may pronounce with some confidence on the decline of the inflammation." — "But let it be borne in mind, that neither the decline of the inflammation, nor its absolute cessation, are the same thing with a reparation of the injury done to the organ. Reparation implies that no lymph remains upon its surface, and that the folds of the pericardium do not adhere. But organised lymph may still subsist after the inflammation has entirely passed away."

With respect to the symptoms of pericarditis, Dr. Elliotson, in his valuable work on "Diseases of the Heart," lays great stress "on the extension of the pain from the region of the heart to the scapula, shoulder, and a certain way down the arm — symptoms which patients will not always mention, unless questioned respecting them; and its increase on strong pressure upon or between the ribs and cartilages over the heart, and upwards under the cartilages of the left false ribs."

Dr. William Stokes, of Dublin, has written some excellent articles on the Diagnosis of Pericarditis, in the Dublin Journal of Medical and Chemical Science. (See Nos. for March and September, 1833.) The very flattering manner in which these articles have been noticed in all the foreign medical journals, and the well known pathological attainments of Dr. Stokes, preclude the necessity of any apology for inserting here the general results of his researches on this subject (pericarditis). We may here observe, that Andral considers auscultation to be merely of negative use in the diagnosis of pericarditis — it is only "par voie d'exclusion," to use his own words, that this diagnosis is in general to be attained. In this view of the matter he is joined by several other very distinguished pathologists, as Laennec, Louis, Rostan, Elliotson, &c. Dr. Stokes, loc. cit., says — "The direct diagnosis of pericarditis is founded on the observation of certain phenomena produced by the morbid condition of the serous surface of the pericardium; these are twofold; the phenomena perceptible by the hand, and secondly, those perceptible to the ear. In the natural state of all serous membranes, the gliding of one surface upon the other meets with no opposition, and is not accompanied by any sound; but

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SECTION II.

OBSERVATIONS ON DISEASES OF THE FLESHY SUBSTANCE OF THE HEART AND ITS INTERNAL MEMBRANE.

6. Under this title we comprise different alterations of texture, the result of which is a disproportion in the capacities of the four cavities of the heart, either with respect to each other, or with regard to the diameter of the vessels which

when, from the effusion of lymph, for instance, these surfaces become for the time roughened, we have then sounds produced by the friction, and vibrations communicated to the surface, and often perceptible to the hand. It may be stated generally, that in cases of pericarditis, the sensations communicated to the hand, and the sounds of friction, will vary according to the following circumstances: — 1st, The state of the effused lymph; 2d, its extent; 3d, the existence or non-existence of fluid; 4th, the advance or arrest of the process of organisation; 5th, the process of obliteration of the cavity; 6th, the repetitions of inflammation. The character of the sounds produced by the physical alterations of the inflamed pericardium are various. In some instances we have a rasping sound, very similar indeed to that produced in the worst cases of ossification of the valves; in others the sound resembles the creaking of new leather, to which it was originally compared by Collin. In others the sound is similar to the frottement of pleurisy, only modified by the action of the heart. It may further occur with a character between that of *bruit de rape* and *bruit de soufflet*, or it may completely resemble the latter phenomenon. Lastly, we may have a slight friction sound, perceptible only at the very commencement and at the termination of each diastole and systole of the heart." After considering the various circumstances which may modify these sounds, and the physical states of the pericardium, by which these modifications may be accounted for, Dr. S. lays down the following propositions as the general results of his researches on this subject: —

1. That in cases of pericarditis with effusion of lymph, the rubbing of the two roughened surfaces causes sounds perceptible to the ear, and vibrations communicable to the hand, by which the disease can be easily and surely recognised, even when all other symptoms are absent.

2. That the more rough is the state of the serous membrane, the more distinct will these signs be.

3. That the sounds accompany the two sounds of the heart in almost all cases.

4. That they are audible generally only over the region of the heart.

5. That they present themselves with various modifications of character, but often resemble the sounds produced by extensive valvular disease.

6. That they are most distinct when the region of the heart continues with its natural sound on percussion, but that the existence of fluid does not necessarily imply their complete subsidence.

7. That they may reappear after the absorption of fluid from the bag of the pericardium, or the new supervention of inflammation.

8. That the sounds may continue when the sensation of rubbing is no longer perceptible by the hand.

9. That they are singularly and rapidly modified by direct antiphlogistic treatment to the heart.

10. That by observing the progress and mutations of those signs, we can trace the process of organisation, or of obliteration of the pericardial cavity, judge of the effect of treatment, and accurately ascertain the exact state of the pericardium.

11. That hence, it must be admitted, that auscultation is of direct utility in pericarditis, and that the diagnosis no longer rests on negative signs.

With respect to the *treatment* of pericarditis, the necessity of employing mercury in conjunction with depleting measures, is now acknowledged on all hands. "From acute pericarditis," (says Dr. Latham, loc. cit.) "which has proceeded to the deposition of lymph, nothing, I believe, can ensure a perfect recovery but mercury so employed as to produce its peculiar and specific influence upon the constitution — mercury producing salivation." The ordinary depleting measures may arrest the progress of the inflammation, and thereby rescue the patient's life for a time; but yet, if after this has been accomplished, the adhesion should still remain, death will be the inevitable result.

There are some observations on pericarditis contained in the *Clinique Médicale* of M.

terminate in this organ or arise from it. These alterations are numerous; they may, however, be divided into three classes; in one there is a diminution of capacity in one or more cavities; in the second, on the contrary, their capacity is increased. In these two cases the parietes of these cavities are either thicker or thinner than natural, and consequently their contraction is stronger or weaker. In a third class, there is no other change but an increase in thickness in the parietes of the cavities, the diameter of the latter still remaining the same. From these different modes of alteration, and from their seat in such and such a part of the heart, there result divers groups of symptoms, which, abstracting from the local symptoms produced by the unusual contractions of the heart, may be referred to the modification experienced, 1st, by the pulmonary circulation, whether arterial or venous; 2d, by the general venous circulation; 3d, by the aortic circulation.

Before pointing out the symptoms which manifest themselves during the course of diseases of the heart, we shall speak of the varied symptoms which mark their onset, and of the different lesions which these symptoms indicate. We shall suppose the pathological anatomy of these alterations to be known. What is there to be said new on this subject, after the excellent descriptions formerly given by Lancisi and Senac; more recently by Corvisart; and more recently still, and with much greater precision, by MM. Laennec, Bertin, and Bouillaud?

CHAPTER I.

LESIONS WHICH EXIST AT THE ONSET OF DISEASES OF THE HEART. SYMPTOMS OF THESE LESIONS.

7. A certain number of hypertrophies of the parietes of the heart, with or without modification in the calibre of its cavities, appear to me to recognise for their commencement an acute or chronic inflammation, either of the pericardium, or of the internal membrane of the heart, or of the aorta. We shall now present a recapitulation of our observations on this subject.

8. Individuals who had always enjoyed good health, who had presented no particular symptom, which could cause one to suspect in them the future existence of disease of the heart, are seized suddenly with an acute, excruciating pain in the precordial region; they feel violent palpitations, their respiration becomes very much embarrassed, their strength becomes suddenly prostrated, and they are confined to bed for several days: then these bad symptoms diminish; the pain disappears, the breathing becomes freer, the strength, which had been prostrated, returns. The individuals do not, however, recover their former state of health; they now have habitually a little dyspnœa, which goes on increasing; they frequently experience beatings of the heart, which are oftentimes preceded or accompanied by a renewal of the precordial pain. If they walk much, or remain for a long time in the erect posture, their ankles soon become infiltrated. These different symptoms become constantly more and more severe, and at last the existence of an aneurism is made manifest.

How shall we explain this succession of symptoms? To what organic cause shall we refer the sudden commencement of the disease? Certainly

Bricheteau (Paris, 1835). But this gentleman's opinions coincide so exactly on this subject with those of Dr. Stokes, from whose memoir, by the way, he has made copious extracts, that to cite them here would be mere repetition. — Tr. See also *Hope on Diseases of the Heart* with Pennock's Additions; *Stokes and Bell's Lectures*; *Williams's Lectures on the Physiology and Pathology of the Chest*; and *Gerhard on the Chest*.

nothing resembles a pericarditis more than the group of symptoms which mark this commencement. Now, in every part where the muscles of organic life are in contact with an inflamed membrane (whether mucous or serous), they have a remarkable tendency to become the seat of a more active nutrition, to become hypertrophied. This is very manifest with respect to the fleshy tunic of the stomach, intestines and bladder, in cases of chronic inflammation of their mucous membrane. By analogy we must admit that inflammation of the membrane enveloping the heart must produce a similar effect in this muscle. Whether, then, the pericarditis, primarily acute, may have passed into the chronic state, or, whether this inflammation, though completely resolved, may, however, have impressed extraordinary activity on the heart's nutrition, the parietes of this organ must have a tendency to become hypertrophied; and if there is any thing to be wondered at, it is that they are not invariably found increased in thickness after all attacks of pericarditis.

A middle-aged man was subjected for a long time to rheumatic pains, remarkable for being very moveable. All at once those seated in the loins and in different parts of the limbs disappeared, and at the same time an excruciating pain was felt in the region of the heart, accompanied by the other symptoms mentioned in the preceding paragraph. Having entered the La Charité some months after, this patient presented all the signs characteristic of general hypertrophy of the heart, with dilatation of its cavities: he died. The organic lesion which had been announced was found in the heart; its orifices were free, but *cellular adhesions united the two folds of the pericardium to each other.*

9. If a pericarditis may be the commencement of a certain number of organic affections of the heart (and this fact seems to us incontestable), we shall be inclined to admit that other hypertrophies of the heart recognise for a primary cause an inflammation of the membrane which lines the inner surface of the ventricles and auricles, and which extends from these cavities either to the arteries or to the veins. The following facts lead us to think that this is not mere conjecture.

In several patients afflicted for a long time with different organic diseases of the heart, with well marked symptoms, we have seen very remarkable phenomena suddenly develop themselves: the beats of the heart suddenly became more tumultuous than usual; the pulse was at the same time differently modified, sometimes very small and irregular, sometimes hard, vibrating, and in this latter case usually presenting much less irregularity. The breathing became very much embarrassed; the general anxiety was carried to the highest degree, and the region of the heart itself was sometimes the seat of the pain more or less acute. In some, these symptoms, after lasting for several days, disappeared; in others they became more and more severe, and ended in death. In the latter case we found, on examination of the body, traces of inflammation on the inner surface of the cavities of the heart and great vessels. This inflammation was announced, 1st, by greater or less redness of this internal surface; 2d, by a well-marked tumefaction of the parts of the internal membrane, constituting the different valves of the auriculo-ventricular and arterial orifices; 3d, by the facility with which we sometimes removed, in large shreds, this same inner membrane within the cavities of the heart; 4th, in some cases by a remarkable softening, an extreme friability in the fleshy substance itself, which was very red and gorged with blood, and which then participated in the inflammation of the internal membrane.

Of these different characters of inflammation, the first only can be disputed. We have elsewhere assigned the motives which incline us to consider as inflammatory a considerable number of red or brown colourings on the interior of the heart and its vessels. We shall only add here, as an additional motive for conviction on this matter, that on horses who were opened immediately after they

were killed, we have found, either on the inner surface of the heart, or in the arteries, or in the veins, the same shades of colouring, as we have referred in man to an inflammatory state; now, in this case, cadaveric imbibition could not have acted any part. Let us add also, that more than once, in man, we have found the aorta red only around ulcerations, that is, in those parts where a process of inflammation could be no longer called in question.

Acute inflammation of the inner surface of the heart and vessels appears then to be the cause, to which we may refer, at least in a certain number of cases, the symptoms above mentioned. Now, these symptoms are precisely those which develop themselves in certain individuals at the commencement of the organic affection of the heart; we are right then in inferring what might be admitted *à priori*, namely, that under the influence of internal carditis, the fleshy substance, consecutively or simultaneously irritated, may be hypertrophied, just as the muscular tunic of the stomach is thickened after a gastritis. But this hypertrophy of the heart depends not only on the irritation communicated to its fleshy substance by the inflammation of its inner membrane: if this latter inflammation pass the chronic state, the membrane which is the seat of it becomes thicker, there particularly where it is doubled to constitute the valves of the different orifices of the heart; for it is a sort of law in pathology, that the circumference of the orifices of communication in the different cavities of the body is struck by chronic irritation with more intensity than the other parts of these cavities. In this case may be enumerated the pylorus, the point of junction of the ileum and cæcum, the neck of the bladder, &c. Not only does this membrane become thickened, but it also becomes the seat of vegetations and various degenerescences. The portions of fibrous tissue which it covers are also thickened; and there, as in every part where it is attacked with inflammation, this tissue evinces a tendency to pass to the cartilaginous or bony state. These different changes have the common effect of contracting the different orifices of the heart, of opposing the free action of the valves, and consequently of impeding the circulation of the blood; thence a greater effort is made by the muscular fasciculi of the heart, and from this excess of action, a more active nutrition and hypertrophy.

The inflammation of the inner membrane of the heart may, like every inflammation, assume from its commencement a chronic course; then the time it commences is most frequently not appreciable by us, and it manifests its existence only by the hypertrophy of the heart to which it gives rise. But the different course of a disease does not change its nature: whether then the different changes of the inner membrane of the heart be preceded in their formation by manifest symptoms of inflammation, or whether the latter remain latent, it seems to us that their cause and primary origin should not be considered as different. Thus two pleuritic effusions are not considered to be of a different nature, because the one was preceded or accompanied by pain, dyspnœa and fever, whilst the other was constantly free from pain, and caused no perceptible disturbance in the respiration and circulation. Thus a very acute gastritis, caused by corrosive poisons, and that which is produced slowly by the daily abuse of alcoholic liquors, are attended to be sure with different symptoms, and still are the same disease.

If, besides, leaving out the examination of the symptoms, we only have recourse to the mere anatomical inspection, we shall still find proofs in favour of our opinion. The contraction of the different orifices of the heart is often caused by the presence of fungous growths on the valves, of vegetations red or grey, hard or soft, with a perfect resemblance to those produced in other organs by an inflammatory process, which, in the latter, is no longer to be disputed. At the same time that cartilaginous or bony productions exist beneath the membrane which forms the valves, the membrane itself is often red, livid, friable and

swollen; at the same time also several points on the rest of the membrane are sometimes perceptibly thickened, whence there are found white patches or spots scattered over the inner surface of the cavities of the heart; at other times, though very rarely, it is traversed by ulcerations variable in form and size. In one woman among others, whose aortic valves were, as it were, surmounted by a fungoid tumour, similar, in its mamillated structure, to certain syphilitic vegetations on the verge of the anus, commonly designated by the name of *frambesiæ*, several of the carneæ columnæ of the left ventricle were traversed by small rounded ulcers, the bottom of which exhibited the fleshy substance red and softened. Here the softening was confined to the surface of the bottom of the ulcer; at other times we have seen it more deeply seated, seize the entire substance of the wall, but only to an extent limited by that of the ulceration of the inner membrane. This softening was such in one case, that slight pressure made by the finger allowed the latter to pass quite through the wall. We have no doubt but it is consecutively to such a softening, connected itself with an internal ulceration, that certain ruptures of the heart take place. Who does not see a perfect analogy between this kind of perforation, and that of which other musculo-membranous walls are also the seat?

Thus, then, a considerable number of contractions of the different orifices of the heart, produced either by vegetations which cover the membrane, or by cartilaginous or bony concretions which raise it, recognise as their commencement an acute or chronic inflammation of the membrane lining the cavities of the heart.

This inflammation appears to be the primary cause of several aneurisms of the heart, either by merely determining an irritation in the substance of this organ, or by producing contractions of the orifices, or altering the texture of the valves so as to obstruct their movements.

10. In certain cases of aneurism of the heart, its orifices are found free, and no trace of either an ancient or recent inflammation is to be found on the inner surface of its different cavities, nor in its external covering. But the aorta is more or less seriously altered; its internal surface has lost the whiteness and polish which characterise its healthy state; it presents different shades of red colouring, under the form of irregular patches or bands. The most varied products are found between the middle and internal membrane, raise the latter more or less, and oftentimes destroy it. Among these products, there is found genuine pus, either in a liquid state, or more or less concrete, constituting small abscesses beneath the internal tunic. Instead of these purulent products, there are frequently observed depositions of a cretaceous earthy substance, which becomes more and more solidified, and acquires the consistence of a bony concretion; in other points there are formed cartilages more or less perfect; at other times there are real vegetations, species of fungus, which sometimes present several of the characters of encephaloid tissue. The existence of one or other of these changes coincides very often with numerous ulcerations, which, commencing on the internal membrane, extend more or less to the subjacent membranes, which form their bottom. Here, as in the heart, the inflammation of the inner membrane seldom leaves intact the subjacent fibrous membrane which corresponds to the muscular tissue of the heart; sometimes this membrane becomes soft, and very friable; it loses the elasticity which constitutes its characteristic property; sometimes, like the muscular substance of the heart, it becomes considerably hypertrophied, and at the same time the cavity of the artery oftentimes increases in calibre. Now the very frequent coincidence of these different alterations of the aorta, with different degrees of hypertrophy of the heart, seems to indicate that the one contributes to the production of the other.

From these facts we think we may draw the following conclusions: 1st. A great number of contractions of the different orifices of the heart recognise for

their commencement an acute or chronic inflammation of the membrane lining the cavities of this organ.

2d. This inflammation is the origin, and primary cause of several aneurisms of the heart.

3d. A great number of cartilaginous and bony productions of the aorta, several of the changes which its middle membrane undergoes, either in its texture, or in its properties, are the result of an arteritis.

4th. These different lesions of the aorta seem to have a considerable share in the production of aneurisms of the heart.

11. Here we entreat the reader not to extend our opinion beyond the limits within which we ourselves circumscribe it. We have just stated than an inflammatory process is the frequent cause of the ossifications of the internal membrane of the heart and arteries: this opinion, already avowed by authors of distinction, might still find an additional demonstration in the analogy of that which takes place in other organs, where a process unquestionably of an inflammatory nature often precedes accidental ossification. But we have not said that such was the case with all ossifications; we think, that in old age, the process of nutrition of several fibrous or cartilaginous tissues may be so modified, that without any increase of sanguineous congestion, these tissues become hard and ossified; and just as by the sole progress of age, the cartilages of the ribs and larynx pass into the osseous state, in the same manner, and without any process of irritation, depositions of phosphate of lime may take place in the interior of the heart and arteries. Still further, in old persons, the calcareous phosphate may be deposited very abundantly around the orifices of the heart and in the aorta, often without the appearance of any of the symptoms which ordinarily characterise organic affections of the heart. Among other cases, we found in a woman, seventy-three years of age, the aortic valves so surrounded with calcareous phosphate, that, being rendered immoveable, two of them could no longer be lowered, the consequence of which was extreme contraction of the aortic orifice. Other incrustations were found at the base of the mitral valve. There was considerable hypertrophy of the parietes of the left ventricle of the heart, with dilatation of its cavity. This woman's pulse was remarkably irregular. The respiration had never been perceptibly embarrassed; she never had the least appearance of dropsy. It seems that in individuals advanced in years, the greater slowness of the circulation, and perhaps the less quantity of blood, render the obstacles, which in the heart impede the free exit of the blood, less injurious. This, at least, is certain, that several old persons present, for many years, a very irregular pulse, without having either dyspnœa or dropsy. However, in the greater number of them, there arrives a period when the breathing becomes impeded, their legs become infiltrated, and they die dropsical. Do these phenomena supervene merely by reason of the progress of the ossification of the orifices, or do they not frequently occur because the heart, continually losing its energy, is no longer able to contract with sufficient strength, so as to overcome the obstacle which impedes the free exit of blood? Thence arises a stagnation of the latter in the cavities of the heart, and consequently dyspnœa and anasarca.

Will it be objected to this latter opinion, that this heart, to which we deny sufficient strength to propel the blood, is however hypertrophied? But the size of a muscle is not the sole condition of its energy. If this mode of viewing the subject be exact, it must modify considerably the treatment of diseases of the heart in old people; bloodletting, in several cases, should not be resorted to but with the greatest caution, and merely as a mechanical means for disgorging the vascular system; but if too copious, or too often repeated, it might become extremely injurious, whilst a stimulant plan of treatment, whether internally, or in particular externally, might be attended with advantage.

But vascular ossifications are not confined to old persons only; we have very

often met them from the age of forty to sixty : several times we have also observed them in persons from the age of twenty-five to forty ; and once, we ascertained the existence of a very remarkable state of ossification in the heart of an individual, who was not eighteen years old when he died : in this young patient, the heart was at least three times the size of the individual's fist. Intimate cellular adhesions united the two folds of the pericardium merely to the extent of the ventricles. The parietes of the left ventricle were very much hypertrophied, and its cavity prodigiously dilated ; the parietes of the left auricle were also manifestly thickened. Two of the aortic valves were ossified at their base. From the auricular surface of the mitral valve, there arose a hard, unequal, mamillated tumour, formed by the union of several calcareous concretions, some of which were no longer covered by any membrane. Projecting from three to four lines above the surface of the valve, this tumour occupied about the third of its extent in breadth, extended from the origin of the tendons to the base of the valve, and penetrated from four to five lines into the very substance of the heart. A little lower, in the substance of the septum of the ventricles, there was found another concretion, totally isolated from the preceding, about the size of a large nut. The aorta was exempt from all change, as well as the right side of the heart.

Many of the vegetations, which cover the valves of the heart, may again have an origin different from those which have been just noticed ; in some cases they are really formed by coagulated blood, which adheres more or less closely to the membrane on which it lies. These clots of blood present themselves as small tumours of an irregular form ; their colour varies according to the mixture, or more or less complete separation of the fibrin and colouring matter of the blood ; they oftentimes entirely resemble old clots of blood which obstruct the veins, and which also, in general, adhere closely to the parietes of the latter. We would be almost inclined to believe that in some cases these clots of blood, this species of polypus, put on the characters of a real organisation, and ultimately become united to the membrane, which at first they only covered, by means of a vascular communication. In these clots of blood, in fact, are found the same elements which, in a false membrane, become an organised tissue. At all events, they may acquire sufficient size considerably to narrow the orifice around which they exist ; this is sometimes the only obstacle which we have met to the aortic orifice, in hearts in which the parietes of the left ventricle were hypertrophied. Thus, then, during life, sanguineous concretions may be formed in the very centre of the circulation, just as they are formed in the different veins, where they may also assume different degrees of organisation.

The existence of these concretions being ascertained, it may be asked what are the causes which favour their formation ? Must we seek them in the mode of the heart's contraction, or else in some particular constitution of the blood itself, which, in certain states of the system, has a remarkable tendency to coagulate, whilst, at other times, it tends on the contrary to remain liquid ? There are some cases, where the blood which escapes from the opening of a vein, for example, assumes the form of a coagulum so rapidly, that it is seen to become solidified on the very edges of the orifice in the opened vein, whence arises an obstacle to the exit of the blood. At other times, on the contrary, all things else being equal, we in vain make pressure on the opening of the vein ; the blood does not coagulate, it continues to flow, and it is then sometimes difficult to stop the bleeding. These facts being known and appreciated, it would remain to inquire, whether therapeutics can furnish us with means calculated to increase or diminish the tendency of the blood to coagulate.

12. The different organic alterations which we have now passed in review, are not the only ones which precede aneurism of the heart, and which may be

considered as favouring its production. The two arterial vessels into which the heart sends the blood, the orifices of communication of these arteries and the heart may be narrower than in the normal state, without there being at the same time any alteration of texture. Sometimes this unusual narrowness is congenital; sometimes it is acquired, and this latter case occurs if the aorta, for instance, is not developed in proportion to the heart. We have twice seen the ventricular orifice of the aorta so contracted that the little finger could not be introduced into it; immediately above the artery exhibited its natural calibre. This narrowing was not occasioned by any accidental production, by any appreciable thickening of the different tissues which constitute the circumference of the aortic orifice. The four cavities of the heart were considerably dilated, and the parietes of the two ventricles hypertrophied. Of the two individuals in whom the alteration just described was found, the one had not given us sufficient information regarding the commencement of his disease; but the other, who was not yet thirty years of age when he died, told us that from his earliest infancy his breathing had been habitually short, and that since he was ten years old he was subject to frequent palpitations, which at the time of puberty became so violent, that they were often accompanied with complete loss of consciousness. It seems, then, that in this patient the extraordinary narrowness of the aortic orifice of the left ventricle was a congenital defect of formation, which produced gradually, and in a way altogether mechanical, the hypertrophy of the parietes of the heart, and the enlargement of the cavities. Here, besides, the obstacle existed only on the left, and yet the right side of the heart participated equally in the disease.

In three other individuals the aorta was very narrow through its entire extent, and the heart presented nearly the same kind of alteration as in the two other patients, in whom the aortic orifice alone was narrowed. The first of these three individuals was fifty years of age when we first saw him. All his life, he told us, his breathing had been short, and whenever he ascended a height, or walked a little quick, he felt violent palpitations. However, up to the age of about forty years, he enjoyed good health: the *slight asthma* with which he was affected, did not prevent him from attending to his business; but whatever tended to accelerate the circulation, and particularly the use of alcoholic liquors, considerably increased the difficulty of breathing, and renewed the palpitations. About the age of forty-two this man was seized, without any known cause, with an acute pain in the precordial region, with great dyspnœa and fever. He then took to bed for the first time, and was bled. The pain was of short duration; the dyspnœa was diminished; but dating from this period, this man continued an invalid: the difficulty of breathing increased gradually; the lower extremities became œdematous, and twelve years after he died of an organic affection of the heart, announced by the aggregate of the symptoms which usually characterise this affection. At the autopsy, there was — 1st, the pericardium adhering to the heart through its entire extent; 2d, considerable dilatation of the two ventricles, with some hypertrophy of their parietes; 3d, a very remarkable narrowing of the aorta though its entire extent. The extremity of the index finger could scarcely be introduced through the orifice of communication between the heart and artery; through all its thoracic portion, this same artery had not the ordinary calibre which it presents immediately above its bifurcation at the lower part of the lumbar column. From its passage through the diaphragm to the origin of the renal arteries, it scarcely equalled the ordinary size of the primitive carotid, and from the latter point to its bifurcation it was smaller than the iliacs usually are.

The different symptoms successively presented by this individual, and the progress of his disease, may be very well explained by the nature of the lesions: he had experienced dyspnœa and palpitations from his infancy; this was ac-

counted for by the smallness in the calibre of the aorta, which here again seems to be congenital. However, well-marked symptoms of aneurism of the heart did not present themselves till after his forty-second year, that is, after the appearance of a group of symptoms, which depended very probably on the attack of a pericarditis, traces of which were found after death. This latter inflammation seemed to be the occasional cause of the more rapid development of the aneurism in an individual already disposed to it by the organic conditions of his aorta.

Another patient, twenty-two years of age, had been employed from the age of twelve years in drawing water from a very deep well several times a day. From this time he began to experience palpitations and great shortness of breath. However, for some years after he continued at his very laborious occupation. The oppression and palpitations became more and more violent, and obliged him at last to suspend his labours on December 26, 1821. He then began to cough. On the 28th, he entered the Hôtel-Dieu, and was bled there several times. He left it the 11th of January, 1822, his breathing being easier, and the cough still continuing. On returning home he felt cold. In the night the dyspnœa and palpitations reappeared worse than ever. The next day, January 12, his legs and hands were œdematous. When we examined him, January 30, he presented the following state: —

Orthopnœa; speech panting; face puffed; lips violet-coloured; lower extremities, abdominal parietes, and hands œdematous. The beats of the heart are heard to be hurried, and with impulsion in the precordial region; they are also heard under the right clavicle. Pulse frequent, full, and regular; heat of skin natural. On the following days the dropsy increased, as did also the dyspnœa; extreme anxiety; pain in the region of the heart. He died on the 4th of February.

Post-mortem. The heart was three times its natural size. The parietes of the two ventricles were very much thickened, and their capacity enlarged; the left might contain a pullet's egg. The interior of the heart and large vessels retained their usual colour; the origin of the aorta, which was very narrow, could scarcely admit the extremity of the index finger; it was dilated a little towards its arch, then became again contracted so as scarcely to be six lines in breadth. Towards its bifurcation, the end of the little finger could not be introduced into it. The primitive iliacs were about the size of the femoral artery at its termination. A copious quantity of lemon-coloured serum was found in the heart, in the two pleuræ, and in the peritoneum. Even the parietes of the gall-bladder were infiltrated. Sanguineous engorgement of the liver; venous injection of the small intestine.

Two causes seem here to have concurred in the production of the aneurism of the heart: the one, internal and congenital, consisted in the narrowness of the aorta; but this cause would probably have acted but very slowly, if from the infancy of the individual an external cause had not been added. The violent exertions to which this person had been subjected from the time he was twelve years old, would probably not have had an injurious influence on any other individual, but in him there was an organic cause predisposing to aneurism of the heart; this cause must have made its effects be felt in consequence of the habitual acceleration of the circulatory movement.

We merely witnessed the *post-mortem* examination of the body of a third individual, in whom there was also coincidence between extreme narrowness of the aorta in its entire extent, and a double hypertrophy of the ventricles of the heart, with dilatation of their cavities. But there was here an anatomical circumstance worthy of attention: the parietes of the descending thoracic portion of the aorta and of its abdominal portion were become so thin as to be transparent; one might have readily taken them for the parietes of the vena

cava; they presented, however, considerable resistance when an attempt was made to rupture them. Dissection informed us that this remarkable thinning of the parietes of the aorta was owing to a real atrophy of the fibrous tunic, which seemed to be in a great measure replaced by a dense cellular tissue, similar to that which is found in the substance of the parietes of the veins, where the longitudinal fibres of their middle tunic are not well marked. Thus, then, in this case, the defect of development of the artery manifested itself not only by the smallness of it calibre, but also by a great diminution in the thickness of its parietes. The subject of this case was a female of about thirty years of age.

As well as the aorta, the pulmonary artery also may present considerable narrowing, and this too may coincide with an aneurism of the heart. We rest the possibility of it only on a single fact, and here again we can give only the details of the *post-mortem* examination. The size of the heart was very considerable; this size depended principally on the hypertrophy of the two ventricles, the parietes of which were very much thickened; the auricle also presented evident hypertrophy of its parietes; when cut into it did not collapse. There was nothing remarkable either towards the different orifices of the heart or in the aorta. But the pulmonary artery was very small; its trunk scarcely exceeded in size that of the primitive carotid; its two divisions were still proportionally smaller. The subject of this case died in the wards of M. Lerminier, during the March of 1820; he was twenty-seven years of age. This man died a little after his admission, so that we had not time to collect from him any information regarding his previous history. During his short sojourn, he presented all the usual symptoms of organic disease of the heart.

In considering the state of the heart in phthisical patients, we shall see how far an induration of the pulmonary parenchyma, by impeding the circulation through the lung, may produce an aneurism of the heart.

Whether the obstacle to the free course of the blood exists in the narrowed aorta, in the trunk of the pulmonary artery, which also may be narrower than natural, or in the vessels within the lung, which may be obstructed or obliterated, it must not be forgotten, that under the influence of these different causes, both palpitations and dyspnœa may be for a long time manifested, without there being as yet any material change in the thickness of the parietes of the heart or in the calibre of its cavities; but there is a continual tendency to the production of this change, and as we have already seen all the moral or physical causes which produce any disturbance in the circulation, accelerate very much the production of aneurism. Thus, during the absence of the palpitations, the application of the hand or the ear to the precordial region will discover nothing unusual in the heart as long as there will yet be no aneurism; the pulse too will be natural. A woman, forty-five years of age, had been somewhat affected with shortness of breath all her life; she lost breath when she went up a height, or when she ran. Any mental emotion, anything capable of accelerating the circulation in her, produced dyspnœa. However, this woman attained her thirty-ninth year without this dyspnœa being so great as to be considered by her a state of disease. But dating from the summer of 1825, violent palpitations, oftentimes accompanied with fainting, began to be experienced; the dyspnœa became much more considerable; from time to time this woman felt acute pains in the precordial region; at other times it was, as it were, an icy coldness she felt in this same region. In the October of 1825, she entered the La Charité; she had wasted away very much for the last few months; nothing indicated a lesion of the different parts of the respiratory organs. On the other hand, except at the time of the palpitations, the heart, when examined with the stethoscope, seemed to be in its natural state in every respect; the pulse was small but regular, and free from frequency, no trace of dropsy had as yet mani-

fested itself. What was the cause, in this woman, of the palpitations, and particularly of the dyspnœa, to which she was subject from her infancy? Everything inclined us to admit an affection of the heart; but, except at the time of the palpitations, this affection gave no local sign. From this group of facts, we suspected in this patient the existence of congenital narrowness of the aorta; she seemed to have arrived at the period when an alteration was commencing in the nutrition of the heart, an alteration probably consecutive on the defect of conformation of the aorta.

13. In fine, we are come to the case where in order to explain the precursor of aneurisms of the heart and the mechanism of their production, we no longer find either the acute or chronic inflammatory state, either of the pericardium or of the internal membrane of the heart, neither arteritis, nor the existence of vegetations, nor of incrustations at the circumference of the orifices, neither congenital narrowness, either of the different orifices of the heart, or of the arteries which arise from it (the aorta and pulmonary artery), nor unusual enlargement of these same arteries, nor, in fine, obstruction of the pulmonary circulation. No doubt, without the existence of any of these causes, the different cavities of the heart are seen occasionally to become dilated or narrowed, their parietes become hypertrophied or thinned. These different changes in the texture of the heart can only be explained by a derangement in the normal state of its nutrition. This derangement may be almost congenital; at least it may be dated from the commencement of infancy. Thus a man, fifty years of age, told us that he had been affected with a shortness of breathing since he was from eight to ten years of age; at twenty-nine and thirty-nine he was attacked with anasarca: however, except at these two periods, he always enjoyed good health, and it was towards his forty-ninth year that the disease of the heart, then probably making more rapid progress, the dyspnœa became more intense, and the dropsy reappeared. When first we saw him, this person presented the characteristic signs of hypertrophy of the ventricles with dilatation of their cavities. On examining the body after death, we found the heart very large, and we ascertained the existence of the species of lesion which had been indicated during life, but the different orifices of the heart were free from all obstruction; the aorta presented no deviation from its normal state; the lungs were sound.

14. The symptoms which we have seen in this article, to constitute what might be called the precursor of the organic affections of the heart, may disappear, after having caused the present or approaching existence of an aneurism to be dreaded for several years. These symptoms are palpitations, more or less frequent, and a greater or less difficulty of breathing. What is there astonishing in that, as we have seen that these symptoms oftentimes exist before there was yet any real organic disease of the heart? Thus, they may be produced, first, by an inflammation of the pericardium, or of the internal membrane of the heart, which, after having lasted a shorter or longer time, will terminate favourably, without the sympathic irritation made on the heart having been violent enough to continue after it, and to modify its nutrition; secondly, by a plethoric state, under the influence of which more blood being formed in the system, and consequently a greater quantity passing through the heart in a given time, there is produced an excess of action in the latter, and thence palpitations, which disappear with the plethoric state, though the continuance of the latter by prolonging the excess of the heart's action may ultimately produce its hypertrophy, in the same way as a muscle increases in thickness under the influence of violent exercise; thirdly, these symptoms may again be occasioned by a vitiated disposition of the nervous influence, which may cause the heart to beat with force or irregularity; just as it produces vomiting, or just as it excites the most disorderly movements in the muscles of relative life.

The palpitations called nervous may manifest themselves in conditions of the

system differing most widely from each other. Thus they are one of the symptoms of the hysterical affection ; they occasionally appear on a sudden in consequence of some strong mental emotion ; we have seen the cases of three individuals, who had never presented the least sign of disease of the heart, up to the moment when some strong impression happened to act on them ; from this moment they were seized with very painful palpitations, which no longer ceased, and at the end of a certain time we discovered in these persons the existence of hypertrophy of the heart. Thus, in this case, the entire disease consisted at first in a disturbance of the nervous system, and this lesion of the innervation was gradually changed into a lesion of nutrition.

Again, palpitations are often observed in chlorotic girls ; and that is even one of the cases in which these palpitations may most easily impose on one for the symptom of an organic affection of the heart. The patients have an extraordinary dyspnœa, which increases the moment they ascend a height ; under the influence of the least exertion their hearts beat with violence, and by means of auscultation the pulsations of this organ are heard to a great extent ; sometimes, even, it repels the ear rather forcibly, and each of its beats is accompanied by a well-marked bellows-sound. The diagnosis is then so much the more difficult as the countenance of the patient presents that paleness and puffing, which mark, at their commencement, many organic affections of the heart. However, after these symptoms have lasted a longer or shorter time, they are observed to disappear, and some patients, who were considered as doomed to die of aneurism of the heart, have been restored to perfect health. The preparations of iron, and particularly the subcarbonate of iron in large doses, succeed very well in such cases, and by successfully combating chlorosis, this mode of treatment has removed the beating of the heart, and the dyspnœa, which are but some of its symptoms.

CHAPTER II.

LESIONS OF ORGANS, OR OF FUNCTIONS RESULTING FROM THE DISTURBANCE WHICH THE ARTERIAL CIRCULATION UNDERGOES IN CASES OF DISEASE OF THE HEART.

15. These lesions may exist, 1st, in the large arteries, whence result divers modifications of the pulse ; 2d, in the arterial capillaries, whence may result simple active sanguineous congestions, or even hemorrhages.

The pulse presents so many varieties in diseases of the heart that only a secondary importance can be attached to it for the diagnosis of these diseases.

There are, at first, a great many cases in which the heart being seriously affected, the pulse does not deviate in any respect from its normal state. This is what almost always happens when the right cavities of the heart alone are affected, and often, also, when the left side is affected. Thus, then, as a general principle, it must not be concluded from the pulse retaining its physiological character that the heart is exempt from change.

The lesions of the pulse, in cases of diseases of the heart, may regard its rhythm, its strength, or its frequency.

It has been said that the irregularity of the pulse indicated the existence of an obstacle at the aortic orifice of the left ventricle. Observation is far from always verifying this assertion : on the one hand, in individuals whose pulse had presented during life the greatest irregularities with respect to the strength of the beats, and their mode of succession, the autopsy showed the existence of no obstacle at the auriculo-ventricular or arterial orifice on the left side of the heart ; and, on the other hand, we have more than once observed a very regular pulse in cases where, after death, we found at the ventriculo-aortic orifice

ossifications, vegetations, or other obstacles. We have ascertained this irregularity of the pulse without any obstacle to which it could be referred, with the existence of the following lesions : —

1st. Simple hypertrophy of the left ventricle, with diminution of its cavity.

2d. Hypertrophy of this same ventricle, with dilatation of its cavity.

3d. Hypertrophy of the two ventricles, with or without dilatation of their cavities.

4th. Simple increase in the size of the right cavities, the left side of the heart being intact.

When the irregularity of the pulse is not produced by an obstacle to the free discharge of the blood into the aorta, it is scarcely apparent, except when the disease of the heart becomes exasperated, when, under the influence of causes more or less appreciable, the dyspnœa becomes more considerable, and dropsy is produced or increased. On the cessation of this exasperation the pulsations of the artery resume their regularity.

If, on the contrary, there exists an obstacle, the pulse oftentimes becomes irregular, long before any other sign of heart disease manifests itself; this happens principally in aged persons. In such cases it is not till several years after the pulse has begun to present striking irregularities, either in the strength or in the intervals of the beats, that the respiration begins to be embarrassed, the first traces of serous congestion appear, &c. It is very probable that in cases of this kind the cause of the irregularity of the pulse resides in ossifications of the aortic orifice, which may exist for a long time without disturbing the pulmonary circulation, and consequently without producing dyspnœa ; but this irregularity of the pulse should not cause the less dread of the future development of other symptoms of diseases of the heart.

Sometimes it happens that every time the arterial beats are counted, they are found to be very regular; but then they may present another species of irregularity, which it is important to know. If we count at different periods of the same day, and even only at the interval of some minutes, we find the greatest variations in their frequency. Thus, for instance, in an individual affected with hypertrophy of the two ventricles, with dilatation of their cavities, in whom the orifices of the heart were free, but whose aorta was traversed with numerous patches, we counted one day one hundred and twenty-one arterial pulsations in the minute ; three or four minutes after we found but sixty, and a little after eighty-three. On the following day we counted in the space of some minutes thirty-seven, fifty, forty-two, fifty, then ninety-six pulsations. In another patient who laboured under great dyspnœa, and was delirious, the pulse when first tried gave but thirty pulsations in a minute, a little after having given sixty-eight.

At other times it is only from one day to another, that, without any known cause, without increase or diminution in the other symptoms of disease of the heart, the pulse presents the greatest irregularities in its frequency. Here is a striking instance of it.

A boy, sixteen years of age, experienced some dyspnœa for several months. The face was livid and puffed, the lips violet-coloured. The beats of the heart repelled the cylinder at the precordial region ; they were heard very loud all along the sternum, under the two clavicles, and more feebly on the left posteriorly. Pulse very weak, and in this respect it presented a striking disagreement with the beats of the heart. A few days after this patient's admission, seventy-two arterial pulsations were counted ; three days after, 20th of December, sixty two ; 21st, forty-four ; the 22d, the same ; on the 23d, the pulse, which was so slow the two preceding days, again became accelerated (eighty). On the 24th, without any change in the state of the patient, the pulse lowered to forty-two. On the 25th it was fifty ; the 26th, sixty-nine. Up to the first

of January nearly the same number; from the 1st to the 3d of January the pulse was but from forty to forty-five.

These great variations in the frequency of the pulse from one day to the other, must be taken into consideration, when we wish to appreciate the effects of certain medicines, and in particular of digitalis. Effects on the pulse have been often attributed to this latter substance, either with respect to lowering or accelerating it, which were altogether independent of it. However, we have satisfied ourselves, that in some cases the lowering of the pulse was the result of the administration of digitalis. In fact, on suspending the use of this substance, the pulse resumed greater frequency; when it was prescribed anew, the pulse was again lowered. We have seen under the well-marked influence of digitalis the arterial beats come down in some days from ninety to fifty, and even forty. In an individual whose pulse was seventy-two, when he began to take digitalis, the beats of the artery were from the following day reduced to fifty-eight per minute; they came down successively to fifty, forty-eight, forty-three, forty, thirty-six, and at last to thirty-two. We thought we remarked that the powder of digitalis, given in the form of pill, exercised a more striking influence on the pulse than the ethereal tincture. This influence varies also according to two principal circumstances: 1st, the nature of the disease of the heart; 2d, the state of the digestive organs.

The result of our observation is, that if digitalis be given in cases of hypertrophy of the parietes of the heart, and when there is still considerable general reaction, the lowering which it produces in the arterial circulation coincides with a perceptible diminution of the dyspnœa, and the other symptoms. In other cases, on the contrary, there was dilatation of the right cavities of the heart with thinness of their parietes; where the general weakness was carried to a considerable degree, we think we found that at the same time the pulse became slower under the influence of digitalis, the dropsy increased, the dyspnœa was far from diminishing, and the patient seemed to become weaker, and to sink faster.

Digitalis lowers the pulse only so long as it does not irritate the stomach. We have seen a case, where the ethereal tincture of digitalis first produced a very sensible diminution in the frequency of the arterial pulsations. The dose was rapidly raised up to eighty drops in the twenty-four hours, in a five-ounce mixture, without any morbid phenomenon appearing with respect to the stomach; up to that time the pulse had become every day slower and slower. In a dose of ninety drops, a slight pain was felt in the epigastrium; the pulse became a little accelerated; after a dose of one hundred drops vomiting was produced, and at the same time the pulse became extremely frequent. The use of the digitalis was suspended, and the gastric symptoms disappeared; but the pulse remained for some time very much accelerated. We shall again return to this subject.

In certain cases where the blood circulates but with great difficulty in the different cavities of the heart, and where it experiences at the same time greater or less obstruction in its passage into the aorta, the arterial beats may be much rarer than those of the heart. One of the most remarkable cases of this kind which we met, was the following: —

A groom, forty-six years of age, experienced some dyspnœa for the last two years: his legs were swelled several times. When he entered the hospital, the symptoms were, orthopnœa, extreme anxiety, countenance violet-coloured, ascites and anasarca, distressing cough. The beats of the heart were irregular in their rhythm; they were heard over a very small extent with a strong impulsion. The hand, applied over the precordial region, felt but an obscure bruissement. The pulse, which was extremely small, *was felt but at long intervals*. Eight or ten contractions of the ventricle were frequently heard with-

out its being perceptible ; then we sometimes felt one, sometimes two or three arterial pulsations in succession. (Frictions with linim. volat. cantharid. ; two blisters to the legs ; oxymel of squill, &c., &c.)

For three or four days following, the patient passed the night sitting on the edge of the bed : the asphyxia was extreme, then the respiration became more free, and at the same time the dropsy diminished rapidly. The urine, which till then was scanty, flowed in great abundance. In proportion as the dyspnœa lessened, the pulse became more perceptible ; but it was still very slow compared with the beats of the heart : thus during several successive days, we counted from thirty to forty arterial beats in the minute, and, at the same time, *one hundred and twenty beats of the heart.* During the fifteen days following, most of the symptoms of the disease of the heart gradually disappeared ; the respiration again became free, or at least the patient did not find it more embarrassed ; the countenance resumed its natural appearance ; there was no longer any trace of dropsy. In a few days after the pulse became perceptible at each beat of the heart ; both were in other respects very irregular. The patient soon left the hospital considering himself as completely cured.

This case, which we have cited here in consequence of the phenomena presented by the pulse, presents to us also a striking example of the rapid manner in which the symptoms of an organic affection of the heart may be dissipated, after these symptoms have been so severe as to make the patient seem to be actually dying. We shall again remark, in this case, the signs furnished by auscultation, which seemed to indicate that the affection of the heart existed only on the left side, a circumstance not announced by the other symptoms.

Again, with respect to its strength, the pulse of aneurismatic patients presents the greatest varieties. First, there are a great many cases in which this pulse is neither stronger nor weaker than in its normal state. And what is remarkable in the matter is this, that there is scarcely one of the numerous organic affections of the heart, in which this natural state of the pulse has not been ascertained with respect to its strength. Does not this prove that the strength or weakness of the arterial pulsations do not depend merely on the thickness of the parietes of the heart, and the size of its cavities, but also on the greater or less energy of the contractions of this organ, an energy which is far from always being in a direct ratio with the thickness of its parietes ?

The pulse, stronger than usual, which raises itself as a tense cord, is principally met in those cases, where, the aortic orifice being free, the parietes of the left ventricle are hypertrophied, without its cavity being perceptibly greater or less than natural.

In the case, on the contrary, where this same left ventricle is hypertrophied, but where at the same time its cavity is very much diminished, the pulse then often presents remarkable smallness. The same thing may occasionally happen also, when the cavity of the left ventricle is considerably dilated.

Considerable narrowing of the aortic orifice is also a frequent cause of smallness of the pulse.

These different cases might be admitted *à priori ;* but here is another still more extraordinary ; it is that when the heart presenting in all its parts an enormous size (*cor bovinum*), which is owing at the same time to dilatation of the cavities and considerable hypertrophy of the parietes, without there being any obstacle to the aortic orifice, the pulse is not only not stronger, or more vibrating, but even weaker than in the normal state. It is then we often remark a very striking contrast between the beats of the heart, which are energetic, very tumultuous, and appreciable by auscultation in almost all the points of the thorax, and the arterial beats, which are sometimes so weak as not to be perceptible. This extreme smallness of the pulse is sometimes the ordinary state ; sometimes it manifests itself only at intervals, when the beats of the

heart became more tumultuous, and the dyspnœa increases ; then in proportion as these symptoms improve, the pulse recovers a certain degree of strength.

16. When the parietes of the left ventricle, being very much hypertrophied, contract with unusual energy, there may thence result some morbid phenomena more or less serious, which depend on the unusual force with which the blood is driven into the arterial capillaries. This afflux is more particularly felt towards the head, in consequence probably of the structure and arrangement of the arteries which carry the blood to it. Thence flushes of heat mounting to the face, and those frequent attacks of dizziness of which several individuals complain who are affected with hypertrophy of the heart. Frequently these attacks of dizziness develope themselves every time that palpitations are felt. More than once we have seen an active sanguineous congestion, which took place towards the encephalon, produce all the symptoms of an apoplexy, which threatened the patient with speedy death ; but these alarming symptoms soon disappeared under the influence of copious bleedings, and it then became evident that there was in the brain only a temporary fulness of the sanguineous capillaries without hemorrhage. But at other times there was real effusion of blood. Thus, then, from the state of hypertrophy of the heart, there may result, with respect to the brain, a first degree of congestion, announced merely by pain of head, vertigo, and dizziness ; a second degree of this same congestion, violent enough to produce a total loss of consciousness, and all the symptoms of cerebral hemorrhage ; finally, this hemorrhage itself.

CHAPTER III.

LESION OF ORGANS OR OF FUNCTIONS WHICH RESULT FROM THE DISTURBANCE WHICH THE VENOUS CIRCULATION UNDERGOES IN CASES OF DISEASE OF THE HEART.

17. These lesions are: 1st, in the venous trunks near the heart, an unusual reflux of blood, whence results the phenomenon, long known by the name of the venous pulse, and perceptible in the jugulars ; 2d, in the capillaries these lesions are much more considerable : they consist principally, either in different congestions, which, acting on different organs, modify more or less their texture and functions, or in serous effusions, which is the merely mechanical result of an obstacle to the free return of the blood from the different venous radicles towards the heart. We shall say nothing here of the reflux of blood in the large veins, because we could add nothing to what has been published on this subject by different observers : but we shall direct our attention more particularly to the different phenomena which result from the disturbance of the capillary circulation, particularly the different sanguineous or serous congestions.

ARTICLE I.

SANGUINEOUS CONGESTIONS.

18. These congestions may have their seat either in membranes or in the parenchyma of organs. The tegumentary membranes, both internal and external, being abundantly provided with capillary vessels, must be considerably

modified with respect to the circulation which takes place in them every time the central organ of this circulation is so changed, that the blood is no longer freely received into its different cavities. Let us now examine in what state, 1st, the skin, 2d, the mucous membranes, are found in diseases of the heart.

19. The skin presents no other alteration than a greater or less modification in its colour, seldom over its entire surface, more frequently only in some parts of it.

The general colouring of the skin of a well-marked bluish tint appears particularly observable in cases wherein there exists an unnatural communication between the two auricles of the heart. This is what constitutes cyanosis, or the blue disease of ancient authors.*

Independently of this rare case, we often see in individuals affected with aneurism of the heart, and whose respiration is very much embarrassed, the entire skin present a livid tint, such as is observed in persons in a state of asphyxia. This livid tint cannot be considered as a characteristic sign of organic affections of the heart, for it must manifest itself every time that any cause whatever puts an obstacle to the free exercise of respiration. But why is it not found then in phthisical patients, the fourth part of whose pulmonary parenchyma scarcely remains permeable to the air? The reason is, because in them there is at the same time a diminution in the mass of blood, so that the equilibrium is re-established between the quantity of air, which may still penetrate into the pulmonary vesicles, and the quantity of blood to be arterialised. It is seen that such is not the case in individuals affected with an organic disease of the heart; likewise, in the latter, the best means of dispelling the livid colour of the skin is frequently to have recourse to large bleedings, which act in a manner altogether mechanical, by unloading the heart and thereby the pulmonary apparatus.

The partial injection of the skin is observed principally on the face. The colouring thus caused is livid, violet, and evidently produced by an unusual accumulation of venous blood in the capillary system of the face. This venous colouring is sometimes so marked that it actually has a tendency to black.

The injection of the face, when carried to the highest degree, scarcely ever manifests itself except in the latter periods of the disease of the heart. But in a less degree it is often one of the first signs of it; it already begins to manifest itself oftentimes before there is yet any other well-marked symptom. It has often caused us to suspect the existence of a disease of the heart as a complication of different affections of the lung, and particularly of phthisis pulmonalis.

Corvisart said that in consequence of the extreme difficulty of the return of the blood towards the heart, whence resulted venous congestions in different points of the skin and of the cellular tissue subjacent to it, these parts may be attacked with gangrene where these congestions were most intense, or what comes to the same, where several causes oppose the return of the blood, as, for instance, in the extremities. However, up to the present time, medical men have rather admitted the possibility of such a gangrene than cited examples calculated to demonstrate its existence. It will not then be deemed unnecessary to give some examples of it here. In some we shall find a remarkable tendency

* Recent observations have shown that a wide communication may exist between the two auricles in adults without cyanosis taking place. On the other hand, the entire periphery of the skin has been seen to present a well-marked bluish tint in cases where the autopsy presented nothing but different organic affections of the heart, without any communication between the auricles.

of certain cutaneous inflammations, apparently very slight, to terminate in gangrene; in others we shall not be able even to ascertain the existence of any previous inflammation.

In the first place, the readiness with which gangrene occurs around scarifications made in infiltrated limbs is generally known; that is certainly one of the strongest objections to this operation, which, on the other hand, often relieves the patient very much, by allowing the serum to escape in proportion as it is formed. Around the part entered by the lancet, we see the skin first become red, then soon become livid, then black, and ultimately become putrid. Here we see two phenomena succeed each other, and we may comprehend their connexion: — 1st, under the influence of the irritation caused by the instrument, more blood is driven towards the point of the skin which has been cut; 2d, the blood accumulates there much more rapidly than it can make its exit, in consequence of the disease of the heart, and from this venous congestion carried to a high degree must result the death of the part. Here, then, it may be seen that a stimulant treatment can be only injurious, if it continue to increase the afflux of the arterial blood, without at the same time arousing the venous circulation; it would be serviceable, on the contrary, if it produced this latter effect; but how are we to be certain of that?

We have thrice seen a slight erysipelas, which affected the skin of the infiltrated lower extremities, quickly assume a brown colour, which indicated a tendency to gangrene. In one of these three cases, the gangrene actually occurred; it affected a considerable portion of the skin of one of the legs, and the patient died. Besides a general increase in the size of the heart, with dilatation of the cavities, hypertrophy of the parietes of the ventricles, and ossifications at the periphery of the aortic orifice, the autopsy showed that beneath the gangrened skin the cellular tissue was infiltrated with serum, but exempt from all inflammation.

In the two other cases, the erysipelas, after having presented for some days a brown, and even an almost black tint in some parts, gradually recovered a better colour; it again became red, and terminated by resolution. In these two cases, the erysipelas manifested itself amidst a state of considerable dyspnœa, which was effectually combated by large bleedings. It was only after the latter were employed, and in consequence of the abstraction of blood, the diminution in the embarrassment of the circulation was announced by the diminution of the dyspnœa, that the brown colour of the erysipelas was succeeded by a red tint of a favourable nature. In these two cases it seems evident that a venous congestion gave to the inflamed skin the brown colour which threatened gangrene. How did the bloodletting act here? By unloading the heart of the blood which obstructed it, it allowed an easier return to the venous blood accumulated where the erysipelas existed. In a little time more this stagnation of blood, peculiarly unfit for the purposes of life, would have brought on the death of the part where it existed. Thus, then, from a mere degree in the intensity or duration of the venous blood, there existed in these two latter cases a simple brown colouring of the inflamed part, and in the first a real gangrene of this same part.

A middle-aged man presented all the symptoms of an organic affection of the heart. The dyspnœa was considerable; there was anasarca, and in particular the scrotum was infiltrated. Suddenly the skin of the bursæ became painful and red, but very quickly this redness passed to a brown, and gangrene made its appearance. A considerable part of the skin of the scrotum fell off in shreds, and abundant suppuration was established around the exposed testicles. For some days the patient's strength declined rapidly, the features became more and more altered, and everything seemed to announce a fatal termination. In this state of things, before and at the commencement of the suppurative pro-

cess, M. Lerminier ordered the scrotum to be covered with fomentations made of decoction of quinquina ; he prescribed tonics internally. A healthy suppuration was established, the strength was recruited, the countenance recovered a more natural appearance ; the sore on the scrotum was nearly cicatrised, and at the same time (what by the way was very remarkable, and a circumstance which some attempted to attribute to a salutary revulsion effected by nature), the primary symptoms produced by the disease of the heart underwent very great improvement ; the dropsy disappeared, and this man, on whom so unfavourable a prognosis had been made, was on the point of quitting the hospital in a tolerably improved state, when he was suddenly attacked with apoplexy, of which he died.

This is not the only case where we have seen, in individuals affected with organic disease of the heart, the dropsy and dyspnœa to diminish under the influence of stimulant treatment. No doubt also but that in other cases a debilitating treatment produces the same effect. On this point nothing general can be laid down, and the choice of one or other of these methods must be directed far less by the nature of the lesion of the heart, than by other circumstances, such as the state of the patient's strength, the time the dropsy has existed, &c.

In the cases just cited, we have seen either gangrene, or the brown colour which precedes it, affect parts which had been first attacked with an inflammation ; one circumstance must here engage our attention in an especial manner — namely, that it was not by the intensity of the preceding inflammation that the gangrene could be explained. Here now is another case in which we shall see a portion of the skin become gangrenous in a patient with aneurism, without any trace of preceding inflammation ; but what this latter case will have in common with the preceding is this, that here again the gangrene will seem to be but the extreme degree of a partial stagnation of venous blood.

A middle-aged man, labouring under an organic affection of the heart, became anasarcous, and had great dyspnœa. The entire skin presented a slight livid tint. One day we found this livid colour become very intense on the skin of the inner part of the chest between the two breasts. The following days this colour, which seemed to us to be the simple result of a great injection of the venous capillaries, increased more and more, and at last it became entirely black, and soon extended to the entire neck. The skin appeared gangrenous over all this extent. The patient soon died. The skin of the thorax was found black throughout ; beneath it the cellular tissue was gorged with a brownish blood. No fœtid odour was exhaled from it.

20. The mucous membranes present, in aneurismatic patients, lesions more varied and more numerous than those of the skin. From the mere stagnation of venous blood in these membranes, which is altogether mechanical, there results not only a red colouring of their tissue, appreciable after death, but consecutively to this accumulation, there are also seen to arise real alterations of texture and remarkable symptoms. In fine, from the circumstance of the redness of mucous membranes in aneurismatic patients being often the merely physical result of sanguineous stagnation, it must not be thence inferred that in them this redness is not also, in a certain number of cases, the result of a real inflammatory process.

We shall describe, in other parts of this work,* the different degrees of sanguineous congestion altogether mechanical, of which the gastro-intestinal mucous membrane is so frequently the seat. The more we open dead bodies, the more convinced we are that this congestion, in its different varieties, may simulate most of the shades of inflammatory redness ; it follows from thence that, in

* See also, on this subject, the 2d vol. of our *Pathological Anatomy*.

all the cases where death had been preceded by signs of asphyxia, the mere redness of the gastro-intestinal mucous membrane cannot often warrant us in admitting that there really has been inflammation. It is less, probably, from the characters of the redness than from its exact circumscription in some points, that we can establish the existence of inflammation.

But from the circumstance of the intestinal redness in aneurismatic patients being most frequently the mere mechanical result of embarrassment in the venous circulation, it would be a serious error to conclude, that, every time this redness is observed, it recognises a similar cause. Often enough it seems to depend on a real inflammatory process, to which in some cases venous congestion probably predisposes. and which is often produced also in these diseases by the unseasonable exhibition of different stimulating medicines, given for the purpose of exciting perspiration, urine or stools. It is, perhaps, because sufficient attention has not been paid to the influences, varying according to the individuals, exercised by these medicines on the gastro-intestinal mucous membrane, that persons have at all times been so little agreed as to their mode of action. Thus, there are some individuals in whom a slight dose of castor oil, administered but once, produces considerable gastro-intestinal irritation, which evinces its existence by symptoms variable in their nature and severity, according to the individual dispositions. To other patients, on the contrary, the most drastic purgatives, such as gamboge, aloes, jalap, syrup of buckthorn, may be given with impunity for several days successively. Not only is there no symptom of gastro-intestinal irritation (seen to manifest itself after the exhibition of these medicines, but we have even more than once found, in such cases, the intestines pale, and exempt from all appreciable lesion, though for several successive days strong drastic medicines had been carried along the mucous membrane, and these medicines had caused copious stools. From these facts it seems to us, that we should conclude, that in several individuals the irritation produced by purgatives is not to be compared, with respect to its nature and its effects, whether local or general, to a real inflammatory process ; it seems that their action is sometimes limited to merely increasing the intensity of the intestinal contraction, sometimes to the producing over the mucous membrane that species of congestion designated by some authors by the name of *secretory irritation*, whence there takes place on the surface of the mucous membrane a more abundant and more active exhalation than usual. We are satisfied that the action of purgatives limited to these effects may be very useful, and is very well indicated in a certain number of morbid states. Instead, then, of proscribing in all cases this class of medicines, because they have been abused, we think it more prudent, and more conformable to physiology, to study their action, to learn their effects, and to demand, not from theory but experience, whether there are cases where they may exercise a salutary influence over the economy when morbidly affected, and what these cases are. It would be going out of our place now to prosecute these researches here ; we shall merely state a case, which shows in a very striking manner the good effects which may be produced, in certain cases of dropsy, by the use of purgatives.

A young man who had been troubled from his infancy with scrofulous tumours, had a cough for some months, when he was seized with an acute abdominal pain, which lasted for three or four days, and which was succeeded by a rapid tumefaction of the belly. He entered the La Charité in the month of September, 1822. The abdomen, insensible to pressure, presented an evident fluctuation ; the pulse was frequent and small. The mucous membrane of the primæ viæ did not appear affected. M. Lerminier considered the ascites to be owing to a slight peritonitis ; leeches were first applied to the anus : on the following days recourse was had to blisters applied to the lower extremi-

ties, aromatic frictions, and diuretics. However, the ascites did not diminish. Purgatives were then tried : the patient took a mixture consisting of one ounce of syrup of buckthorn, and two ounces of castor oil ; a copious purgation took place. After several stools composed of excrementitious matters, the patient voided nothing but limpid serum of a slightly yellow tint. Several pints of serum were thus voided by stool in the space of fifty hours ; at the end of this time the belly was lessened in size, there was no fluctuation any longer felt ; then the diarrhœa lessened, and ceased spontaneously in a few days. Several months after this person died of the increasing progress of the chest disease. Tubercles were found in the lungs. Several of the intestinal convolutions were united together by old cellular adhesions (the peritonitis having been cured). Here and there on the surface of the peritoneum small masses of tuberculous matter were found. The internal surface of the intestines presented no other appreciable lesion except some crude tubercles which were developed in small number beneath the mucous membrane.

We have elsewhere cited a case where, at the same time that a copious exhalation of serum was established on the surface of the bronchi, the absorption of a hydrothorax took place. Here again we see the same coincidence of phenomena, the absorption of serum on one part, a copious exhalation of it on the other, take place in the abdomen. But in the first case every thing was accomplished by the mere efforts of nature ; on the contrary, in the case just cited, the fluxion towards the intestinal mucous membrane was, if not produced, at least favoured by the administration of a purgative. It is certain, no doubt, that in many other individuals this medicine had not such an influence, and that it merely gave rise to some evacuations without any result ; it is no less certain, that in other cases this same purgative may have even been injurious. But it is in the difficult tact of ascertaining precisely the suitable moment for administering a medicament, that a great part of the practice of medicine consists. Let us not think, then, that we have done every thing, when, after having decided that a disease is a local irritation, we combat it by bloodletting and emollient drinks ; for there are cases also, where these means are, as well as purgatives and all other therapeutic agents, either useless, or even injurious.

Among the other medicinal substances most frequently administered in diseases of the heart, digitalis is one of those whose therapeutic effects are least constant ; and one of the causes of this inconstancy must certainly be attributed to the influence of digitalis on the stomach, which is variable, of course, according to the individual. Thus, there are some patients who cannot take a few grains of the powder of this plant, or a few drops of the tincture, without vomiting being produced. Every time the digitalis produces in the gastric mucous membrane a certain degree of irritation, its diuretic effects no longer take place, and, far from lowering the motions of the heart, it renders them more frequent. Shall we therefore renounce the employment of digitalis ? Certainly not ; but in employing it we should never lose sight of the state of the stomach and intestines.

Whatever be the cause under the influence of which the gastro-intestinal inflammation has developed itself, the symptoms to which this inflammation gives rise may be referred to three principal groups.

1st. In a considerable number of cases irritation of the stomach, or of the intestines, is announced only by rather obscure local symptoms ; but this irritation reacts sympathetically on the heart, and the symptoms arising from the affection of the latter are very much aggravated. Thus its beats acquire unusual frequency ; they become irregular and tumultuous ; the difficulty of respiration increases : these symptoms again acquire for a while a higher degree of intensity every time that food is taken into the stomach. Among other instances we saw an individual, in whom the ingestion of simple drinks was immediately

followed by dyspnœa, so that lying down became impossible, and for about two hours the person was as it were threatened with asphyxia. At the same time that under the influence of the gastro-intestinal inflammation the local symptoms of heart disease are increased in severity, we also see dropsy, either manifest itself for the first time consecutively to the increase in the disturbance of the venous circulation, or become increased, if it did exist before, or finally reappear, if, after having already existed, it had disappeared. These different symptoms become aggravated as long as the affection of the digestive tube exists, and they amend along with it.

2d. At other times the gastro-intestinal inflammation does not aggravate in so marked a manner the symptoms of disease of the heart; neither does it announce itself by well-marked local symptoms; but it seems to react chiefly on the nervous system, and produces the symptoms of what is called adynamic fever. We have more than once seen this form of disease appear in individuals labouring under aneurism of the heart, in cases where different stimulating medicines had been introduced into the primæ viæ. We then see the tongue become red and dry, and to assume a brown or black tint; the stools become liquid and copious, without there being either abdominal pain or vomiting; the pulse acquires great frequency, the features soon change, the prostration soon becomes extreme, and death is the frequent termination of this adynamic state. On opening the body, we find in the intestines traces of inflammation, which are often confounded, however, with those left by simple mechanical injection. What is very remarkable is, that frequently at the same time that the adynamic fever, symptomatic of an intestinal affection, shows itself, and in proportion as it acquires greater intensity, the symptoms of the heart affection become less marked; the dyspnœa is not considerable; the serous congestions which exist in different parts of the body diminish, or are even entirely reabsorbed, so that in this case the patients do not die of the disease of the heart. If, therefore, death does not then supervene amidst a state of asphyxia, it follows, that the redness presented by the gastro-intestinal mucous membrane cannot be entirely attributed to the mechanical stagnation of the venous blood, and that is a further reason for admitting that it is the result of an active sanguineous congestion, in fact, of inflammation.

The mere removal of every kind of stimulating treatment is often sufficient to put a stop to the state just now described; under such circumstances the application of leeches to the anus oftentimes produces a good effect.

We have stated, that supervening inflammation in the primæ viæ causes in several persons affected with aneurisms of the heart an apparent adynamic state, which, often produced by the abuse of a stimulating treatment, sometimes becomes quickly fatal, and sometimes disappears, either solely in consequence of suspending the use of stimulant remedies, or under the influence of an antiphlogistic treatment more or less active. But we do not mean to infer from this, that what is called adynamic fever is uniformly, in aneurismatic patients, the result of a gastro-enterite. We think we may say, that in all cases of chronic diseases where an organ has been a long time suffering, as the heart in aneurismatic patients, we often observe the group of symptoms constituting adynamic fever (including in this dryness and blackish state of the tongue) without there being any real gastro-intestinal inflammation. It seems that in cases of this kind the long continued suffering of an organ important to life, modifies, perverts, and seriously alters the two powerful agents, which hold the entire economy under their control; the blood, on the one hand, whence emanate all the materials which enter into the formation of the organs; and the nervous system, on the other hand, which presides over the due arrangement of these materials, or which, at least, if it does not uniformly concur in the first intance, exercises, in all cases, an undoubted influence over the entire process of

nutrition and secretion. Whatever be the explanation which may be given of it, we have more than once found the intestinal canal exempt from all appreciable lesion in persons affected with different chronic diseases unconnected with the digestive apparatus, and who died with the aggregate of symptoms characterising adynamic fever (black incrustation of the tongue, gums, and teeth; pulse weak and frequent; leaden hue of the face, stupor of the countenance, tremors and automatic movements of the muscles, obtuse state of the intellect, and of the different sensations, &c.). For the last six months, particularly of the year 1825, more than one fact of this kind was observed at the La Charité. Are we to say that the group of the symptoms of what is called adynamic fever has its seat nowhere? Far are we from entertaining such an idea; since there is disturbance of functions, there must likewise be disturbance of organs. But it is certain that the intestinal canal is not always the seat of these symptoms. Where is this seat? Very probably in the two great systems of which we spoke just now: in the nervous system, in the blood, which are necessarily and irresistibly modified with respect to their functions, their properties, and the proportion and nature of their anatomical and chemical elements, by the chronic disease which affected a part of the organisation.*

This species of adynamic state may be only apparent, as that which is symptomatic of an affection of the primæ viæ, and then it requires nothing more than a mild treatment. But it may also be real, and then the stimulating treatment has been employed with decided advantage. Several times have we seen M. Lerminier administer internally different preparations of bark, and at the same time excite the skin very actively either by irritating frictions or by the application of a great number of blisters, in persons labouring under disease of the heart, and who fell into the adynamic state already described. Sometimes this treatment was of no advantage, or even it exasperated the symptoms considerably; but sometimes also we have seen the strength aroused under this treatment, the tongue resume its natural appearance, the cold extremities again become warm, the clearness of the intellect restored; in a word, life, which was well-nigh extinct, again lighted up, without the symptoms of the cardiac disease being at all aggravated.

From all that precedes we shall conclude that the adynamic state which is so frequently observed during the progress of organic affections of the heart, is, in a great number of cases, the result of an inflammation of the primæ viæ; but that sometimes also it is independent of it, and that the treatment useful in one of these cases is not suitable in the other. No doubt such a distinction is not always easily made; but because an object eludes our sight, must we deny its existence? Let us place ourselves in another position, and we shall often discover it.

3d. In fine, there are cases where the irritation of the primæ viæ, in aneurismatic patients, no longer produces the preceding symptoms, but it is principally announced by others purely local. The appearance of the latter often follows the administration of different medicines more or less stimulating; we have already insisted on this point. First, the patients complain of no longer having

* No doubt, in the cases referred to, these lesions of the blood and of the nervous centres were not discovered in the *post-mortem* examination; but are we therefore to say that they do not exist? More than once, although, during life, a very marked disturbance was observed in the functions of the brain or spinal marrow, these centres, when examined after death, appeared in their normal state. It is, however, certain that in this case they are seriously altered; but their lesion escaped us, and we admit it only by induction. The latter may, unquestionably, in a great number of cases, lead us to results as positive, perhaps even more rigorous than actual and immediate observation. It is in our opinion one of the greatest errors to which the ill-directed study of pathological anatomy can lead us, not to admit any other alteration in the animal economy but those which are discoverable by the scalpel.

an appetite; they feel a weight, or even an acute pain in the hypogastrium; finally, when the affection of the stomach has become more severe, they are seized with vomiting, which may be very copious and very frequent without the patients saying that they feel any real pain towards the region of the stomach. If these symptoms appeared after the more or less continued use of stimulating medicines, all that is frequently necessary to dispel the symptoms of the gastritis is to suspend the latter.

In other patients, the stomach is but little altered; but there comes on a diarrhœa, sometimes serous, and free from pain, sometimes attended with abdominal pains; tenesmus and bloody stools also may be observed.

In these different cases, the tongue is very far from being always a faithful index of the state of the primæ viæ. Thus, on more than one occasion where there was obstinate vomiting with pain in the epigastrium, we have seen the tongue preserve its natural moisture and colour. On the other hand, we already remarked, that the black incrustation of the tongue was not necessarily connected with the degree of intensity of the gastro-intestinal inflammation.

21. The mucous membrane of the air-passages, as well as that of the digestive passages, frequently becomes, in aneurismatic patients, the seat of sanguineous congestions. They are observed also whether there be dilatation, or narrowing of the cavities of the heart, whether its parietes be hypertrophied or thinned, whether, in a word, the seat of the disease resides in the right or in the left cavities. In all these cases, in fact, the circulation of the blood in the interior of the heart no longer going on as in the normal state, this fluid must have a tendency to flow back, and stagnate in the pulmonary vessels. It is easy to conceive, then, that in proportion to the invariable intensity of this cause of stagnation, or, of the accumulation of blood in the lung, the congestion produced in this organ must also present a great number of degrees.

The different degrees of pulmonary sanguineous congestion, from whence there are produced, in the bronchial mucous membrane, a great many shades of redness, are indicated during life by different degrees in the difficulty of respiration. In fact, if more blood than is natural be accumulated in the pulmonary vessels, it is evident that the quantity of air ordinarily introduced into the lungs, will no longer be sufficient to arterialise the entire mass of blood, which is diffused in superabundance over the parietes of the pulmonary vesicles; thence the necessity of the introduction of a greater quantity of air in a given time, and consequently a greater frequency in the inspiratory movements, and a feeling of oppression. So long as the sanguineous congestion is not very considerable, this introduction of an excess of air into the lungs is performed instinctively; the patients do not yet habitually feel any oppression; but it is easily perceived that their speech is already short, and their breathing hurried; if we apply the ear to the thoracic parietes, the respiratory murmur is heard to be performed with unusual strength, an evident proof that the air-passages receive a greater quantity of respirable fluid. This anormal intensity of the respiratory murmur, its distinctness being still preserved, is often observed before any other sign has demonstrated the existence of an organic affection of the heart: it does not prove that the latter exists, but it affords a certainty that some cause or other impedes the free passage of the blood through the pulmonary vessels. But if the sanguineous congestion becomes more and more considerable, a period arrives when, notwithstanding the efforts made by the patient to introduce the greatest possible quantity of air into his lungs, the quantity of atmospheric gas which enters as far as the ultimate bronchial ramifications becomes insufficient to duly modify all the blood accumulated in the lungs; on the other hand, the portion of this blood, already arterialised, oftentimes can no longer flow freely into the left cavities of the heart: thence, an additional obstacle to the entrance of the venous blood into the lung, and consequently a reflux and stagnation of this latter: 1st, in the right cavities of the

heart; 2d, in the large venous trunks which enter into it; 3d, in all the parenchymatous tissues, whence these venous trunks bring the blood towards the heart more or less directly. Then the difficulty of breathing is carried to the highest degree of intensity, the asphyxia is imminent; the patient feels that an insurmountable obstacle is opposed to the entrance of the air into his lungs; however, this air still enters freely into the vesicles, and the feeling of suffocation arises solely from the quantity of air introduced being no longer proportioned to the mass of blood to be arterialised.

It is in cases of this kind that copious bleedings are often of the greatest service. By means of them we have seen a patient who appeared to be in the last gasp actually restored to life. The extremities had already lost their heat; the eyes were dead, the face livid, the respiration accompanied with a rale, the pulse irregular, intermittent and scarcely perceptible; in a few hours the patient was dying in a state of asphyxia; but scarcely did the blood commence to flow through a large opening in the vein, when the suffocation lessened, the skin lost its livid colour, the extremities again became warm, and the pulse rallied, &c. The cause of the asphyxia in this case being known, it may be readily understood how the sudden abstraction of a great quantity of blood may be attended with such beneficial results. This is a proof, among many others, that the indication of bleeding, in diseases, must be often derived less from the nature of the symptoms which present themselves, than from the knowledge of the lesion on which these symptoms depend.

The dyspnœa often precedes for a long time all the other general signs of diseases of the heart; this particularly happens, when it is connected with hypertrophy of the ventricle, with dilatation or diminution of its cavity, any obstacle whatever to the free passage of the blood existing at the aortic orifice. In the case, on the contrary, where the disease exists primarily in the right cavities of the heart, traces of dropsy are observed to appear before the respiration has become perceptibly embarrassed.

The dyspnœa depending on a simple affection of the left ventricle, may first manifest itself only at intervals; it is observed every time, for instance, that a mental emotion accelerates momentarily the beats of the heart, or after violent or unusual bodily exercise; afterwards it returns more frequently and without an appreciable cause: at a later period, in fine, it becomes continued: there then exists permanent embarrassment in the pulmonary circulation; consecutively to this habitual impediment to the course of the blood, the right cavities of the heart may be dilated, their parietes may become thickened; and thus it may be easily conceived how the disease of the heart, at first limited to the left ventricle, may extend to all the parts of the organ.

In persons of advanced age, there may be hypertrophy of the left ventricle, with greater or less obstruction at the aortic valves, without the breathing undergoing, for a long time, a perceptible embarrassment. (The affection of the heart is otherwise announced in this case, either by the impulsion, which is perceived in the precordial region, or by the intermissions and great irregularity of the pulse.) The preservation of the freedom of breathing in old people depends probably, 1st, on the diminution of the entire mass of blood; 2d, on the less rapidity of the circulation. However, whether it is that the hypertrophy of the heart continues to increase, or its contraction becomes less energetic, there comes a period, when the breathing is no longer performed with so much freedom; these old people soon become asthmatic, then the lower extremities begin to be infiltrated. Sometimes at the moment when this infiltration manifests itself, the dyspnœa sensibly lessens: is it because the quantity of liquid left by the blood in the cellular tissue so far diminishes the quantity of that which must pass through the lung? But this sort of amendment in one of the most dangerous symptoms is but temporary. The difficulty of breathing

and the dropsy then increase in a nearly equal proportion, and death soon takes place. We have already discussed the important question, as to how far it was rational, in cases of this kind, always to have recourse to a debilitating treatment. Apart from all theoretical explanation, it is certain that in more than one old person placed in the circumstances above described, we have seen the dyspnœa become less, and the dropsy disappear, at the same time that strong stimulating applications were made to the skin, and either tonics, such as quinquina and wine, or different diuretic stimulants, such as the preparations of squill, were given internally.

In the same way that the blood accumulated mechanically in the vessels of the gastro-pulmonary mucous membrane is oftentimes deposited by real transudation on the free or adhering surface of this membrane, in a similar manner the vessels which traverse the ultimate bronchial ramifications, may also allow the blood to escape through their tunics, which blood, filling them to excess, gorges and distends them. Where, in fact, there is identity of causes and identity of organs subjected to the action of these causes, there must be an identity of effects produced. The hemorrhage which, in persons affected with aneurism of the heart, takes place very often in the lung, and which has been described and designated by MM. Laennec and Corvisart by the name of pulmonary apoplexy, recognising the same mode of production as the intestinal hemorrhage which occurs in the same individuals, must then have the same seat as the latter, that is, a mucous membrane. This is readily appreciable in the case where the transudation of blood takes place in bronchi of a considerable calibre: it is not rare to find them filled with a frothy red liquid in the bodies of aneurismatic patients who die in a state of asphyxia. But does this same transudation take place in the smaller branches and at the ultimate extremities of the bronchial tree? Then we can no longer distinguish the very fine canals in which the blood is contained, and in one or several points of the lung we observe merely a hard black mass, which seems to us to be nothing but the result of the distension of the small bronchi of one or more lobes by coagulated blood. We have elsewhere cited cases which prove that these masses of pulmonary apoplexy may be equally met on the dead body, whether blood may or may not have been spit during life. We should be very much disposed to think, that in most of the cases the blood which is expectorated no more comes from the place where the lung is found hard and black, than from the rest of the bronchi. But the blood, after escaping from its vessels, is merely accumulated and coagulated in this place, whilst at other times it was carried out according as it was deposited on the bronchial surface. According to this way of viewing the matter, what is called pulmonary apoplexy can differ from simple sanguineous exhalation of the bronchial mucous membrane only in its being seated in the smaller branches of the air passages. It may be conceived also, that if these branches are too much distended by blood, their very delicate parietes may be burst, in the same way as they are torn if too much air distends them; then there will be really an extravasation of blood on the exterior of the pulmonary vesicles; but this extravasation appears to us as deserving to be considered but an accidental circumstance. Thus, then, pulmonary apoplexy, considered with respect to the anatomical lesion which constitutes it, is not in our view of the matter a particular disease differing from simple hemorrhage of the mucous membrane. With respect to the symptoms to which it gives rise, they should have something special by reason of the complete obliteration of some small bronchial ramifications and pulmonary vesicles which are their probable termination. Thence increased dyspnœa; thence again those modifications in the respiratory murmur already remarked by Laennec.

Not only the mucous membrane of the bronchi *becomes congested* mechanically, as has been just said, in the different periods of organic diseases of the

heart, but very frequently also, in the same way as the gastro-intestinal mucous membrane, it becomes the seat of genuine inflammation, which first returning in an acute form, at intervals more or less remote, ultimately becomes permanent under a chronic form. The principal symptom of this is a cough more or less distressing, which is usually accompanied with a copious expectoration. These phenomena being often more apparent than those of the diseases of the heart, engage particular attention, and the dyspnœa, which often becomes extreme in the midst of fits of coughing, is merely considered as the result of the pulmonary catarrh. No doubt the mere secretion of a great quantity of mucus on the inner surface of the bronchi can present no obstacle to the free ingress of air into the pulmonary vesicles, and consequently does not become a real cause of dyspnœa; but what observation seems to have proved to us is, that in the very great majority of cases, where a chronic bronchitis is accompanied with considerable oppression, there exists at the same time an organic affection of the heart: the latter is primary in a great number of cases; at other times, however, it seems to be developed only consecutively to the diseases of the air passages.

From the frequency of chronic bronchitis in aneurismatic patients, it happens that the respiratory murmur, after having been for a long time remarkable in them for its strength and clearness, becomes obscure and changed, by its admixture with the varied rales which are observed in the different cases where the parietes of the bronchi are affected with chronic inflammation. If these rales exist in the left and anterior side of the thorax, they are sometimes sufficiently intense to mask the different murmurs which appertain to the heart.

In the organic affections of the heart, more than in any other case, the small bronchi exhale in very great quantity a colourless muco-serous liquid, which accumulating in the air passages, produces during life — 1st, an increase of dyspnœa; 2d, the two varieties of moist bronchial rale, constituting, according to their seat in smaller or larger bronchi, the crepitating and mucous rales of Laennec. After death, on cutting into the lung, there is seen to flow out in great abundance the serous liquid, whose presence in the bronchi occasioned during life the symptoms just now mentioned; this liquid is seated in the bronchi, for it is intimately mixed and blended with a great quantity of air. It is evident that it would not present this frothy appearance, if it had been formed, and had its seat either in the intervesicular or interlobular cellular tissue. The presence of this liquid in the air passages constitutes the affection designated by Laennec under the name of pulmonary œdema; but this does not seem to us a suitable name, for it would seem to indicate that the serum which flows from a slice of cut lung, and the existence of which was announced during life by the crepitating rale, it would appear, I say, that this serum has its seat in the cellular tissue interposed between the different anatomical elements of the lung, which is not the case. This œdema seems to us to be nothing else than a form of secretion of the mucous membrane of the bronchi, which being found particularly in cases of diseases of the heart, is sometimes connected with a chronic inflammation of the bronchial parietes, and sometimes appears to be but the simple result of the mechanical transudation of a portion of the serum of the blood, when the latter, in consequence of the embarrassment of the circulation, fills and distends beyond measure the extremely delicate vessels which ramify over the mucous membrane of the bronchi. We do not mean to say that the interlobular cellular tissue of the lung may not itself sometimes become infiltrated with serum, and be *œdematised;* but this genuine œdema can only be recognised when, by the aid of a minute dissection, the lobules are separated from each other without being first cut into; it is then ascertained that the cellular tissue interposed between them has become more apparent by a small quantity of serum, either colourless or reddish, effused

into its meshes; but this serum is not frothy: being rather closely retained in the fine cellular tissue in which it was formed, it is not seen to flow out when the lung is cut into; in a word, this is not the kind of pulmonary œdema described by Laennec; for it neither presents its signs during life, nor its anatomical characters. We shall have an opportunity of returning to this species of interlobular serous infiltration, when treating of the origin and nature of pulmonary tubercles.

The chronic bronchitis, which complicates organic diseases of the heart, should not be left to itself. We should particularly oppose to it an active treatment, when it occasions a cough which returns in long and frequent fits; for these powerfully contribute to augment the pulmonary congestion, they increase the dyspnœa, and may even be one of the causes which tend to accelerate the progress of the heart disease; in this way the pulmonary catarrh, after having appeared only consecutively to the lesion of the heart, hastens on the progress of this lesion. Leeches applied from time to time over different points of the thoracic parietes, blisters or other topical irritants placed on these same parietes, oftentimes diminish the intensity of the bronchitis in a remarkable manner. The inspiration of emollient vapours we often found useful. When the bronchial inflammation is essentially chronic, when the principal symptom which announces it is a very abundant secretion of mucus, when the fits of coughing seemed brought on principally by the instinctive desire to expel this mucus, we must have recourse to another mode of treatment. Then we have seen, in more than one case, after antiphlogistic means were employed without any benefit, different substances more or less stimulating to be administered with advantage. On such occasions M. Lerminier often employs different resinous preparations, and in particular Morton's balsamic pills, the root of polygala senega, quinquina, Iceland moss, Kermes' mineral. Under the influence of these different medicaments, we have seen in more than one case the expectoration become less abundant, the fits of coughing be rendered less frequent, and consequently the distress sensibly diminish, whether caused by the enormous quantity of mucus secreted and accumulated in the bronchi, or more particularly as having been the result of the disturbance of the circulation produced by the fits of coughing. A similar amendment has sometimes succeeded the frequently repeated exhibition of tartar emetic in a dose capable of exciting vomiting, or of strong purgatives. It is not necessary to mention that, when these different therapeutic means are employed, the greatest attention must be paid to the effect they produce, whether in the primæ viæ, or in the heart itself. They must be abstained from, if there be reason to suppose that the stomach is already irritated, or that it is very susceptible of irritation; they must also be given up, if the pulsations of the heart are accelerated, if the least exasperation be observed in the local or general symptoms which announce the affection of this organ. But if no such thing exists, we recommend practitioners to try with confidence this mode of treatment; our own experience has satisfied us of its advantages; here, as in many other instances, this method will be useful or injurious, according to the circumstances under which recourse may be had to it.

At other times, when the fits of coughing are very distressing without the expectoration being very abundant, when they are accompanied with much dyspnœa and anxiety, the same benefit can by no means be derived from the different stimulating medicines of which we have spoken; narcotic preparations, in different forms, may then be given. The gummy extract of opium, the salts of morphine, the extracts of lactuca virosa, hyosciamus, belladonna, aconite, prussic acid, prescribed in suitable doses, are means which, though they do not stop the bronchitis, calm and moderate, however, its most annoying symptoms, and which may exercise, we repeat it, the happiest influence over disease of the heart itself, by diminishing the frequency and severity of the fits of coughing, which contri-

bute very much to exasperate it. In such cases I have seen the sulphate of quinine, combined with opium, render these same kinds of cough more infrequent, and less painful, when mere emollients were found not to have the slightest influence on them.

21. There is another organ, which, as frequently as the gastro-pulmonary mucous membrane, becomes the seat of very remarkable venous congestions, particularly when the right cavities of the heart are affected; that organ is the liver. It is only consecutively to its engorgement, that the mucous membrane of the digestive tube becomes seriously injected.

It is not only after death that venous engorgement of the liver may be ascertained in aneurismatic patients. If this engorgement is carried to a certain degree, the liver increases in size; it passes beyond the edge of the ribs, and makes a greater or less projection below them. This organ is thus seen to become tumefied very rapidly after an exasperation in the symptoms of the disease of the heart. The presence of the liver below the ribs is then recognised, either because its thin edge may be easily circumscribed in the hypochondrium, or merely because in this same hypochondrium, an unusual resistance is found, on feeling it, which does not exist on the opposite side. Oftentimes, also, this tumefaction of the liver is but temporary, and when under the influence of suitable treatment, and particularly copious bloodletting, the symptoms of the disease of the heart have been ameliorated, the liver is no longer found below the ribs, and the right hypochondrium recovers its former softness. Thus we may see the liver descend several times into the hypochondrium, in the course of a disease of the heart, and so low too that it may be felt on a level with the umbilicus, and then, at the end of a very short time, it retreats and reascends behind the ribs. At other times, however, the engorgement of the liver survives the exasperation of the symptoms of the disease of the heart: though the disturbance of the circulation is no longer but inconsiderable, and the respiration is but slightly embarrassed, the liver retains an unnatural size, and its engorgement then may often keep up the intestinal congestion as much and more than the disease of the heart, and thus produce ascites. It is in cases of this kind that the frequent application of leeches, either over the region of the liver, or in particular to the anus, an hemorrhagic derivation produced and kept up towards this latter point, a gentle revulsion on the intestinal canal by means of laxatives, travelling also, which may produce a favourable change in the circulation of the liver, have caused these hepatic engorgements to disappear, which commenced in simple venous congestion, and which is one of the affections designated by the vague term of obstructions of the liver. Do these engorgements of the liver, which are altogether mechanical, being connected with a disease of the heart, sometimes originate a certain number of organic affections of this viscus? We shall have an opportunity of discussing elsewhere this important point of practical medicine.*

22. At the same time that the liver increases in size, under the influence of a venous congestion, it would seem that the spleen, whose blood, carried by the splenic veins, traverses the liver before returning to the heart, must become engorged and tumefied in the same proportion as the liver; nothing of the kind however happens, and in the cases where, after a disease of the heart, all the tissues, and particularly the liver, were gorged with venous blood, we have indifferently found the spleen, sometimes tolerably large, sometimes with its normal dimensions, sometimes too even smaller than in its natural state. In one

* The influence of these merely mechanical hyperemias of the liver on the production of its organic affections, appears at least very questionable. In fact, such affections are but very rarely met in the liver of individuals affected with diseases of the heart. Thus the mere fact of the habitual sojourn of an unusual quantity of blood in an organ is not sufficient to produce in this organ lesions of nutrition of secretion.

case, in particular, where the liver, soaked with blood like a sponge, filled the right hypochondrium, as well as the epigastrium, and descended to the level of the umbilicus, the spleen, which was of a tolerably dense texture, and of a brownish red interiorly, was scarcely as large as a nut. Would it not appear, however, that, in consequence of its texture and of the functions attributed to it by several physiologists, the spleen must become gorged with blood more easily and to a greater amount than the liver, in all cases where there is a disturbance of the circulation ?*

ARTICLE II.

SEROUS CONGESTIONS.

23. When in a living animal the principal vein of a limb be tied, the experiment being so conducted that the blood cannot be freely carried by the collateral veins above the part tied, this vein becomes distended below the ligature, and, consecutively to this obstacle to the venous circulation, some serum is effused around the tied vein (Fodere). If, in man, a large venous trunk be compressed, or obliterated, so that the blood no longer circulates in it, whilst at the same time the collateral vessels can supply but imperfectly the principal vein thus obstructed, an effusion of serum is also seen to take place where this venous engorgement has occurred (Bouillaud). This dropsy is even much more marked than that which takes place in an animal in which a large vein has been tied, because in this latter case the collateral veins cannot be obliterated by the experimenter, as they are often in man, when the principal vein in which they terminated has become diseased. But if the obstruction no longer exists merely in the veins of a limb, if it occur in a vessel into which the blood of a much greater number of parts empties itself, then the dropsy will necessarily become more considerable. If, for instance, the obstacle to the return of the blood exists in the abdominal vena cava, the two lower extremities, as also the scrotum, will become filled with serum. If it be the trunk of the vena portæ, which is more or less completely obliterated, it is in the peritonæum that the serous collection will first take place ; it is in this way we may suppose that certain diseases of the liver become causes of ascites. If, in fine, the obstacle to the free return of the venous blood exists at the very centre of the circulation, namely, at the heart, we must then draw the theoretical conclusion, that, in this case, the circulation of the venous blood being every where embarrassed, serous collections must form in all directions, and the dropsy become general. This case, anticipated by theory, is actually established by experience. All practitioners know that dropsy is one of the most common symptoms of the different organic affections of the heart; and from what has been said this may be easily accounted for. These different pathological facts receive also a strong illustration from the splendid experiments of M. Magendie, regarding the causes and mechanism of exhalation and absorption ; and, in their turn, they illustrate these experiments, and confirm their results.

24. All the organic affections of the heart are not followed by dropsy with equal frequency, and in the same degree ; and here again experience discloses what theory might anticipate. In fact, it is principally in the cases of change in the proportion of the right cavities of the heart that the most considerable serous congestions are seen to manifest themselves. The separate alterations of the right side of the heart, which we have seen to coincide with these

* Since the publication of the first edition of this work, I think I have ascertained that the ordinary state presented by the spleen in diseases of the heart, is a great density of its tissues.

congestions are the following; we shall enumerate them in the order of their frequency: —

1. Dilatation of the cavity of the right ventricle, with hypertrophy of its parietes.

2. The same alteration, and still further, a similar lesion in the auricle.

3. Dilatation of merely the cavity of the right auricle with hypertrophy of its parietes, and at the same time an obstacle to the free passage of the blood from the cavity of the auricle into that of the ventricle. We have seen three cases of this kind.

In two cases the narrowing of the auriculo-ventricular orifice was owing to the cartilaginous thickening of the tricuspid valve. In the third case this valve was replaced by a sort of fibrous septum nearly immoveable, a real diaphragm, pierced at its centre by a round opening which could scarcely admit the end of the little finger.

4. Dilatation of the cavity of the right auricle and hypertrophy of its parietes, without the existence of any obstacle at the auriculo-ventricular opening; no other lesion in the heart. We have seen this case but once. The first symptoms of heart affection declared themselves in this case after an acute pericarditis; here, as in other cases already cited, this pericarditis appeared to be the occasional cause, under the influence of which the right auricle of the heart became aneurismatic. This case seems deserving of being given in detail.

A man, sixty years of age, of a very strong constitution, having served in most of our campaigns, from that of Egypt to that of 1815, enjoyed good health till the March of 1822. He never had experienced any difficulty whatever in his breathing. He was then attacked with an intense bronchitis, which still continued May the 5th. On that day, without any known cause, he was seized with a very acute pain in the præcordial region; at the same time he had extreme dyspnœa, very great general anxiety, and was obliged to keep his bed. (Copious bleedings were resorted to.) At the end of from eight to ten days, these symptoms were amended, but the breathing remained embarrassed; this dyspnœa went on increasing, the strength diminished, and the patient entered the La Charité the 22d of July. For the last three or four days only the parts round the ankles began to appear œdematous; from the 22d of July to the 15th of August the œdema extended to the centre of the lower extremities, to the upper extremities, and the peritoneum itself soon became filled with liquid. The tincture of digitalis, at first given in the dose of fifteen drops in a mixture, then raised at the end of some days to thirty, was discontinued, because it occasioned vomiting, which ceased spontaneously as soon as the use of the digitalis was given up. The beats of the heart were heard to be in their normal state in the præcordial region; they were not heard under the left clavicle, but at the lower part of the sternum they were very perceptible, and accompanied by a loud bruit. The pulse was weak and regular; the respiratory murmur was heard everywhere loud and distinct. (Leeches were applied from time to time to the anus; blisters to the legs.)

Towards the end of August the thighs were enormously distended; incisions were made into them, which soon emptied them, but were followed by very acute pains, though no redness was observed around the incisions. In a little time severe diarrhœa set in; the patient became rapidly exhausted, and soon died in an adynamic state.

The pericardium was found adhering to the heart through all its extent. The left cavities of this organ were in their natural state, as was also the right ventricle. But the right auricle, enormously dilated, exceeded in size the three other cavities of the heart combined. When emptied of the half-coagulated black blood which filled it, it retained nearly the same size. Its parietes were evidently hypertrophied. The right auriculo-ventricular orifice was perfectly

free. The great arterial and venous trunks presented nothing remarkable. General injection of the digestive tube. Liver gorged with blood.

5. Another affection of the right side of the heart, which we have seen to coincide with general dropsy, is an almost total effacement of the cavity of the right ventricle, without the parietes of this ventricle being otherwise hypertrophied, or the other parts of the heart presenting the slightest trace of organic change. In this case the dropsy seemed to recognise as its cause the permanent engorgement of the right auricle, which could drive into the diminished cavity of the ventricle but a very small quantity of the blood which it received from the veins. During life auscultation could discover in the heart no appreciable lesion, and the dyspnœa had never been very severe.

In a second class of dropsical patients, there is found no alteration in the right cavities of the heart; but on the left side the heart is seriously affected. The following lesions are found in it: —

1. Obstacles of different kinds, either at the auriculo-ventricular orifice, or at the aortic orifice, coinciding with different degrees of dilatation and hypertrophy of the left ventricle and auricle. The common result of these obstacles is to prevent the free afflux of the blood of the pulmonary veins into the auricle; thence embarrassment in the right cavities, consecutive on the left circulation, and hence the production of dropsy. It must not be forgotten, however, that in some cases we have found either the mitral valve, or the aortic valves, covered with bony incrustations of sufficient size to impede their movements, in persons already advanced in years, who died of an affection totally unconnected with the organs of circulation, without having ever had the least trace of dropsy.

2. Increase in the size of the ventricle and auricle of the left side (dilatation of the cavities or hypertrophy of the parietes), without obstacles at the orifices.

3. Simple hypertrophy of the parietes of the left ventricle, with dilatation or narrowing of its cavity, and the existence of an obstacle at the aortic orifice.

4. The same alteration of the left ventricle, but without any obstacle at the mouth of the artery.

In certain cases, where there was anasarca and ascites, we found only this latter description of change in the heart; but as in several other subjects, and even in the greatest number, there is observed a similar lesion of the heart, without there ever being any trace of dropsy, we should perhaps conclude from this, that in cases of this kind, where the latter was observed, there was but a mere coincidence between the existence of serous congestion and that of isolated hypertrophy of the left ventricle, without an obstacle at the aortic orifice. It may be conceived, however, that when the cavity of this ventricle is very small, and at the same time its contractions are performed with but little energy, the blood having arrived in the left auricle cannot be admitted into the ventricle with as much facility as in the normal state; this obstacle to the entrance of the blood, resulting from the diminution of the cavity of the ventricle, may be equivalent, with respect to its effects, to the obstacle arising from the narrowing of the auriculo-ventricular or aortic orifices. Thence, as in the other case, a reflux, a stagnation of the blood in the pulmonary vessels, engorgement of the right cavities of the heart, &c.

In fine, we may rank in a third class those dropsical patients in whom the two sides of the heart are simultaneously affected. Thus, under certain circumstances, the left ventricle is so developed that it seems to have encroached on the place of the right ventricle, which in reality no longer exists, except in the form of a kind of appendix, with a cavity that is very small, and totally insufficient to receive all the blood which in the normal state should be sent to it by the right auricle. At other times the two ventricles are simultaneously dilated and

hypertrophied ; the auricles may be at the same time enlarged in the same proportion, and then the entire heart may present an enormous size. Sometimes, even when the dimensions of the entire heart are thus prodigiously increased, the orifices of communication between the different cavities of the heart are found to be narrowed ; sometimes these orifices have all retained their normal diameter, and the valves at their circumferences have preserved their usual freedom of action, and their natural mobility. In the first of these cases, the determining cause of the dropsy is easily conceived whatever be the orifice altered ; but, in the second case, why is it produced ? For then all the cavities being nearly in the same physical conditions, must they not receive and propel the blood which enters them in an equal proportion and with equal freedom ? If, then, there be no obstacle to the circulation, if there be neither stagnation nor retardation of the course of the blood within the heart, the dropsy should not take place. There is no doubt, however, but that it is observed to occur in cases of this kind ; then the cause may probably be sought in the excess of capacity of the cavities of the heart relatively to that of the vascular system. But our own observation warrants us in concluding, that serous congestions are then much less constant and less considerable, than when the simultaneous increase in the dimensions of the different cavities of the heart coincides with the narrowing of one or more of their orifices.

25. The dropsy, caused more or less directly by the different kinds of organic affections of the heart, which we have now passed in review, presents in its successive development a nearly uniform course. It may be laid down as a sort of law, that in all dropsy connected with a disease of the heart, the serous effusion begins to manifest itself towards the inferior part of the lower extremities around the ankles. This effusion attacks by little and little the entire of these limbs, extending always from below upwards. Often, but not always, the hands become infiltrated at the same time as the circumference of the ankles, and before the œdema has gained the upper part of the legs. The total infiltration of the upper extremities is more rare than that of the lower ; it never takes place in some aneurismatic patients. The face begins to become tumefied at an early period ; but this tumefaction remains for a long time very inconsiderable, and it would at first appear to be an increase in flesh. The infiltration of the face does not become really considerable until the dropsy has attained a very high degree in the other parts of the body. The infiltration of the scrotum and of the penis developes itself in some patients almost at the same time as the œdema of the circumference of the ankles ; in others, by reason of those inexplicable individual dispositions so constantly observed in the study of pathology, this infiltration does not supervene until serous congestions exist already in several parts. With respect to the infiltration of the subcutaneous cellular tissue of the thoracic and abdominal parietes, nothing determinate can be said regarding the time of its appearance.

The cellular tissue diffused over the interior of the body also presents occasionally traces of infiltration, in cases where the dropsy has been considerable and of long duration. This infiltration is particularly observed — 1st, in the sub-serous cellular tissue, either that interposed between the mediastina, or that which exists between the substance of the heart and the pericardium ; 2d, in the submucous cellular tissue, whether of the gall-bladder, or of the urinary bladder, or of different parts of the intestine, but never of the stomach.

Among the serous membranes, the peritoneum is that which is most frequently filled with serum, consecutively to organic affections of the heart. But almost always, the first signs of ascites do not begin to manifest themselves till the infiltration of the cellular tissue has progressively extended from the malleoli to the upper part of the thighs. If the contrary takes place, we may conclude almost with certainty that the production of the ascites is not owing to the dis-

ease of the heart, whether the latter exist or not, and that it depends, for instance, on an affection of the liver, or on a more or less latent peritonitis, &c.

The effusion of serum into the pleuræ, or in other words hydrothorax, results much more rarely than ascites from organic diseases of the heart; it is the same with hydropericardium. With respect to the accumulation of serum in the different portions of the cerebro-spinal arachnoid, it has not appeared to us to be manifestly greater in cases of disease of the heart than in other affections.

Theory might easily have foreseen these different results of experience. The first traces of dropsy, we have said, appear around the ankles; and it is actually in this part, the most remote from the heart, that the influence of an obstacle to the venous circulation, existing at the very centre of this circulation, should begin to be first perceptible. Serum, we have again said, accumulates more frequently and in greater quantity in the peritoneum than in the other serous membranes; this is easily accounted for by the passage of the veins of the peritoneum through the liver gorged with blood.

26. The different serous congestions now enumerated, form and increase with very variable rapidity. There are some individuals in whom the only trace of dropsy observed for a very long time, is a little œdema around the ankles. In others, on the contrary, a very few days after the first appearance of this œdema, the entire cellular tissue and the peritoneum become filled with a great quantity of serum. We once saw a very large double hydrothorax form in less than fifteen hours in an aneurismatic patient, who was for a long time affected with anasarca and ascites. The last time we saw him, he was carefully examined both by means of auscultation and percussion. The respiratory murmur was heard everywhere with strength, and in several parts its clearness was modified by different râles. Everywhere also the thoracic parietes, when percussed, seemed to resound as in their natural state, neither was the patient in a condition at all different from that in which he was on the preceding days. No new symptom appeared in him up to two o'clock in the afternoon, but then he began to feel his breathing more embarrassed than usual; in the evening the dyspnœa became extreme. The following morning at seven o'clock he was evidently dying. The violet colour of his countenance indicated that he was dying in a state of asphyxia — at eight o'clock he was no more.

The autopsy showed the existence of an enormous effusion of limpid serum into each pleura. The two lungs were strongly compressed along the sides of the vertebral column. The entire cavity of the thorax seemed in a manner filled with nothing but the liquid of the pleuræ, as well as by the heart, which presented its two ventricles dilated and hypertrophied with ossification of the aortic valves and of the aorta itself.

No doubt the double hydrothorax discovered on the *post-mortem* examination, did not begin to form, or at least did not become any way considerable, till about fifteen or twenty hours before death. Effusions have been more than once seen to form as rapidly in consequence of acute pleuritis; but that is, I think, much rarer in hydrothorax. Besides, it may be doubted whether in this case the hydrothorax was the product of the affection of the heart. It always happens that, if it was the result of a modification of the venous circulation this modification cannot be appreciated; if it had its seat in the heart, why do we not see the anasarca and ascites increase at the same time? There is a something unknown in the matter, which we are not yet able to unravel.

Just as certain serous effusions are formed with great rapidity, in the same way do we see several of these effusions sometimes disappear with remarkable promptness. There are some patients, in whom, notwithstanding all the means employed, the dropsy has remained stationary for several months; then all at once without medical treatment appearing to contribute to the matter in the slightest degree, the effused serum disappears; no trace of it is any longer

observed at the end of a very few days; sometimes the total reabsorption is still more prompt; we have seen it, for instance, commence and be completed in less than twenty hours.

This rapid reabsorption of serum is accompanied by different phenomena, and produces various results, which it is important to consider.

The rapid disappearance of the dropsy is sometimes preceded and accompanied by an obvious improvement in the state of the patient; sometimes, on the contrary, it is as it were the signal of the most alarming consequences, and is followed almost immediately by death.

In the first case, at the same time that the effused liquid is reabsorbed, different serous fluxes manifest themselves; we have elsewhere mentioned a case in which the reabsorption of a hydrothorax coincided, in one patient, with the exhalation of a great quantity of serous fluid at the surface of the bronchi: in another patient we saw an intestinal flux, which was also serous, manifest itself at the same time that an ascites disappeared. All practitioners know that great discharges of urine consisting in a great measure of serum, also that copious sweats coincide often, as cause or as effect, with the disappearance of several dropsies. These two latter fluxes seldom coexist; however, we very lately saw an instance of it in a young man, who presented obscure local symptoms of a disease of the heart, and who was affected with anasarca and ascites for more than two months. The skin was habitually dry, urine scanty and deposited a sediment. All at once and simultaneously very abundant sweats set in, and a great quantity of serous urine was discharged. This double exhalation continued for three days, and in that time the dropsical liquid was reabsorbed.

Under other circumstances this fluid is absorbed without any unusual evacuation being observed at the same time. What becomes of the serum then? It remains mixed up with the blood, whilst in the former case it seems to be separated from it at the surface of the skin and in the parenchyma of the kidneys.

Can this great quantity of serum remain with impunity in all cases, mixed with the blood? May it not sometimes give rise to fatal consequences, either from the sudden increase of the mass of fluid circulating in the vessels, or from the equally sudden change in the nature of its constituent principles? It is certain that these results supervene, and may be very well ascertained in animals, into whose veins a certain quantity of water has been injected. During the time immediately following this injection, an undoubted influence is exercised on their brain: they remain immoveable, and sink down; their walk is tottering. At the same time, and more constantly still, their respiration becomes hurried, they pant, as if they had been running a long distance; but the secretion of urine, and particularly the pulmonary exhalation, soon become more abundant. By means of these salutary evacuations, the system becomes freed from the foreign liquid introduced into the circulation, and the animal quickly returns to the state of health. If the injection of the water be continued, more serious consequences are perceived: the lung becomes more and more engorged, and death supervenes, amidst something like a state of asphyxia. We find on the dead body, 1st, the lungs filled with a great quantity of frothy serum; 2d, commencing aqueous effusions into different serous cavities.

May we not make an application of these facts to what takes place in man, when dropsy to a considerable extent disappears all at once without any evacuation taking place? What we wish to state is, that in such cases we have several times seen the same series of phenomena manifest themselves in man as in the animals who received a great quantity of water into their veins. Thus, without an additional appreciable lesion of any organ, without any known cause, during and after the sudden disappearance of the dropsy, the patients sink all at once, their intellects become impaired, their sensations are abolished, their breath-

ing is embarrassed, the tracheal râle sets in, and they die very soon in a state of asphyxia. This we have seen several times. In such cases the autopsy discovers the pulmonary apparatus considerably engorged with a colourless, frothy serum. In some instances at the same time that one serous cavity is emptied of the liquid which was accumulated in it, some other serous cavity becomes the seat of a new dropsy;* and what is remarkable is, that this species of metastasis sometimes takes place to those cavities which are most seldom filled with serum, in consequence of diseases of the heart. Thus, in the individual affected with double hydrothorax, whose case we have already mentioned, the abdomen became lessened in size, the collection of fluid in the peritoneum was reabsorbed at the same time that the pleuræ became filled with serum. Here is another and rather a rare instance of this sudden metastasis of dropsy.

A man, about fifty years of age, was admitted into the La Charité in 1819: he presented, in a very marked manner, the different local and general symptoms of an organic affection of the heart; particularly he had considerable anasarca and ascites. One morning we found him entirely deprived of consciousness, the eyes fixed, the mouth open and immoveable, the face pale. The four extremities when raised fell again by their own weight as inert masses; the skin, when severely pinched, presented only some traces of obscure sensibility, that was indicated by a slight contraction of the muscles of the face. This apoplectic state manifested itself only since the preceding night; for we were assured that the day preceding the patient still enjoyed all the freedom of his movements, as well as the perfection of his intellects. One circumstance struck us: the abdomen, *which was very large twenty-four hours before, was considerably diminished in size, and fluctuation was no longer perceptible: the infiltration of the limbs was also gone.* The breathing was accelerated and accompanied with a râle: he died some hours after the visit.

Nothing resembled an attack of apoplexy more than the group of symptoms presented by this individual during the last hours of his existence; still no trace of hemorrhage was found in the brain; but the cerebral hemispheres appeared as it were sunk; when touched, they gave the sensation of a sort of obscure fluctuation. They were cut into from above downwards into thin slices, and we had not yet arrived at the ordinary level of the upper wall of the lateral ventricles, the centrum ovale of Vieussens was not yet exposed, when the fluctuation was become extremely perceptible, and soon, on removing one thin slice more, a considerable quantity of colourless limpid serum was seen to gush forth with force. This serum accumulated in the lateral ventricles, as well as in the third, and had distended them prodigiously; the middle parts of the brain (corpus callosum, septum, and fornix) had preserved their usual consistence; only the septum was remarkably transparent. No other appreciable alteration existed in the brain or its appendages. In the chest, the lungs were found engorged, the heart increased in size in all its cavities, with cartilaginous and bony incrustations at the circumference of the auriculo-ventricular and arterial orifices of the left side. In the peritoneum there was but a very small quantity of serum occupying the flanks, and the cavities of the pelvis: when the limbs were cut into but a very small quantity of liquid flowed from them.

This case presents an instance of true serous apoplexy, the commencement of which coincided in a very marked manner with the reabsorption of the fluid, previously accumulated in the peritoneum and cellular tissue of the extremities.

The sudden reabsorption of serous congestions, without any supplementary evacuation, is not, however, uniformly followed by symptoms as serious as those now described. Is it because in this case the vascular system, containing but little blood, may receive an additional quantity of liquid with impunity?

* For a case of this kind, see Diseases of the Encephalon, p. 42, note.—Tr.

Thus, when before injecting water into the veins of an animal, we have bled him copiously, none of the phenomena just mentioned are seen to occur in him. We can conceive also, that there may be several other reasons for the difference of the effects produced in consequence of the sudden reabsorption of dropsical liquids.

Dropsy may manifest itself at different periods of the disease of the heart. First, it must be acknowledged that, *cæteris paribus*, the time at which the first serous congestion appears, varies in a very singular manner, by reason of unaccountable individual peculiarities; but further, this appearance, more or less premature, is often dependent on the kind of lesion which the heart has undergone. Thus our cases lead us to admit the following general rules, which, however, we say, are far from being without exception; these rules are nothing but the expression of the most constant elements, which we have been able to obtain amidst the great number of infinitely varying elements constituting the phenomenon, which we are endeavouring to analyse.

1st. When the disease of the heart has its primary seat on the right side, and when this disease is one of those which may cause any obstacle to the return of the venous blood towards the right auricle, dropsy may develope itself at a very early period; it may for a long time precede the dyspnœa; it may, in a word, be the first morbid phenomenon, which induces any suspicion of the existence of a disease of the heart, the other symptoms of which, whether local or general, will not show themselves till a very late period.

2d. When on the contrary the disease of the heart exists primarily on the left side, if it happens to be one of those which we have above noticed as being capable of embarrassing the pulmonary circulation, then the dropsy does not ordinarily show itself till a longer or shorter time after the other signs have appeared. It is almost always preceded, in this case, by a difficulty in the breathing, which may last for several years before the first traces of dropsy have appeared.

3d. In fine, if the two sides of the heart be simultaneously affected (which is certainly the most usual case), nothing so precise can be any longer laid down; and according to the predominance of the affection of such or such a cavity of the heart, the dropsy will be seen to precede, accompany, or follow the dyspnœa, and the other morbid phenomena.

27. Whatever be the period at which serous congestions first appear, in the majority of cases they are seen to appear and disappear several times before they become permanent. The first attack of dropsy is sometimes separated from the following by a great number of years; during the interval the individual sometimes presents all the appearances of good health, sometimes he has palpitations, habitual or intermittent dyspnœa, and other well-marked signs of an organic affection of the heart.

The causes which influence the return of the dropsy are those which, by exasperating the disease of the heart, tend to disturb the venous circulation: these causes are very numerous. Thus among these causes the varied modifications produced on the heart by the innervation deviating from its normal state occupy one of the first places. Thus, in individuals, who, labouring under an affection of the heart, have already had an attack of dropsy at a period more or less remote, we see the latter reappear in consequence of violent mental emotions, night-watching, and exertion of mind; these causes may also produce a primary serous congestion; but when the latter has once taken place, it is then reproduced with much more facility under the influence of the slightest causes. We have sometimes seen at the La Charité persons labouring under aneurism of the heart which was not yet far advanced, in whom the dropsy manifested itself with increase of the habitual dyspnœa, of the palpitations, &c., after excess in spirituous liquors; in others it was after violent exercise, or unusual bodily fatigue, that the dropsy supervened.

Different diseases which manifest themselves during the progress of the affection of the heart sometimes exercise a remarkable influence on the production of dropsy; and always primarily by modifying the movements of the heart, whence results an increase in the embarrassment of the venous circulation. Thus, in several aneurismatic patients we have seen serous congestions either establish themselves for the first time, or reappear in consequence of an acute inflammation of the pulmonary parenchyma, or even of a simple chronic bronchitis, which had become momentarily exasperated, and had passed into the acute form; in other patients it was during a gastro-intestinal inflammation, or after it, during convalescence, that the dropsy became manifest. We shall cite the following case in particular, which appears worthy of remark for this reason, that the disease of the heart began to manifest its existence only at the same time as the dropsy, which supervened for the first time during convalescence from a gastro-enteritis.

A man, twenty-three years of age, presented the following state when he entered the La Charité, in April, 1824: general debility, face red, suborbital headache, tongue white with red points, great thirst, pain in the epigastrium, increased by pressure; serous diarrhœa; pulse frequent, regular, and full, presenting the characters usually existing in every febrile disturbance. (Leeches to the anus.) For the eight or ten days following the fever did not abate; the tongue assumed an uniform red tint; the intellect became disturbed at intervals; he was bled twice, and towards the fifteenth day of the disease, the symptoms which had constantly been getting worse, began to amend, and the patient was proceeding gradually towards convalescence. The tongue had for some days back recovered its natural appearance, the diarrhœa had ceased, and the fever was quite gone, when the person observed to us that his legs were infiltrated: we then interrogated him carefully with respect to his habitual state of health previous to the acute affection for which he had entered the hospital: he assured us that he had always been in excellent health before his present illness; that he never had the slightest appearance of dropsy; that on no occasion had he experienced either pain or palpitations in the precordial region. We examined the heart with the stethoscope; it did not present either unusual impulsion or bruit, but its beats were heard over a great extent, namely, all along the sternum, and on all the anterior part of the thorax on the right side; the pulse, being again examined, presented no morbid character. From the information furnished by auscultation, and notwithstanding the absence of dyspnœa, we thought it probable that this person had a dilatation of the right cavities of the heart; thence the true cause of the commencing dropsy: the latter made rapid progress; in less than fifteen days the entire subcutaneous cellular tissue was infiltrated, and manifest fluctuation was observed in the abdomen. However, the breathing remained free. (Frictions, with tincture of digitalis, and vinum scillæ; blisters to the legs; oxymel of squill, &c., &c.) The dropsy neither increased nor decreased for nearly a month; then, at the same time that the urine began to flow in abundance, the infiltration promptly disappeared, and he soon left the hospital, fancying himself quite recovered, but still retaining what we considered an appreciable morbid phenomenon, namely, the unusual extent of the heart's pulsations.

Few dropsies more closely resembled what has been called essential dropsy, than that with which this patient was attacked; however, it was connected with an affection of the heart, it was the first symptom which made us suspect its existence. Having supervened during convalescence from an acute disease after a prolonged course of medical treatment and several bloodlettings, did this dropsy depend on this circumstance, namely, that the right cavities of the heart being dilated, having lost their ordinary contractile power, allowed the blood to accumulate within them? According to this view of the matter, the best treatment to be employed in this case was to give the patient wholesome strengthen-

ing nourishment, in moderate quantity. In fact, we might remark, that in this patient the active exhibition of diuretics did not perceptibly contribute to the disappearance of the dropsy, but that it disappeared according as nourishment was allowed, and the patient recovered strength. Thus, then, though having the advantage over the ancient physicians, of recognising the real organic cause of this dropsy, we were led in this particular case to the same mode of treatment as that which would have been employed by them. We are convinced that if, in this case, in consequence of the existence of the affection of the heart, strict diet and more bleedings had been employed, the symptoms of the organic affection, far from disappearing, would have become more and more severe.

In this particular case the assertion above advanced also finds confirmation, namely, that when the aneurism commences on the right side of the heart, the dropsy may become manifest before the breathing has become embarrassed, or at least before such embarrassment has been perceptible to the patient.

28. Dropsy, considered as a sign of organic affections of the heart, may afford, with respect to the existence and nature of these affections, information, the importance and accuracy of which will vary according to the circumstances which we shall now enumerate.

First, there are cases where, at the same time that there is dropsy, we observe other signs characteristic of an organic affection of the heart, such as those furnished by the respiration, by the pulse, by auscultation, by the application of the hand over the precordial region. Then the cause of the dropsy cannot be doubtful.

At other times the pulsations of the heart present nothing unusual; they are sometimes even more obscure than in the normal state. The pulse retains its strength and its usual regularity; but the patient breathes with difficulty, and traces of dropsy begin to manifest themselves. It is in cases of this kind that before the recent progress made in pathological anatomy, before the writings of Corvisart, it used to be said that the patients were threatened with dropsy of the chest, and no account was taken of the latent affection of the heart. But it is now quite clear to all those who have cultivated pathological anatomy, that nothing is rarer than an idiopathic hydrothorax. Out of about six thousand patients we have not observed more than five in whom there existed what we would consider real essential dropsy of the chest; that is to say, unaccompanied by any appreciable lesion which could account for the great effusion of serum into one of the pleuræ. In this small number of cases the hydrothorax was the only serous collection which existed, it was sometimes preceded either by ascites or anasarca.

From these facts it follows that the coincidence of dyspnœa and of dropsy, without any other sign to announce an affection of the heart or liver, does not indicate, as several writers have stated, and as several respectable physicians think, the present or future formation of the disease called *dropsy of the chest*. But are these two morbid phenomena sufficient to afford certainty that there exists an affection of the heart, when the latter does not reveal its existence by any other symptom? The mode in which the dropsy developes itself may here afford the greatest light. If it first show itself around the ankles, and has extended progressively from below upwards; if the upper extremities and face are also infiltrated; if the ascites has manifested itself only consecutively to the serous congestions of the extremities and face; if, in fine, the dyspnœa observed has existed before the ascites was considerable, and that, consequently, we cannot refer it to the mere pressure made on the diaphragm by the peritoneal liquid, then the probabilities for the existence of a disease of the heart become so strong, that they may be considered as nearly equivalent to certainty; for the examination of the body after death proves that when this aggregate of morbid phenomena has

shown itself, it is only in extremely rare cases that the heat has not been found affected.

It follows from these considerations, that in the absence of the local signs furnished by auscultation, the existence of diseases of the heart may be oftentimes detected with almost equal certainty, by the general signs now pointed out. It may happen, also, that the signs afforded by auscultation, the pulse, &c., after having been very manifest, disappear, or become at least much more obscure ; we observe this often enough in the hospital, when the patients have been sojourning there for some time. It is then only by the existence of the dropsy, by the particular way in which the face is injected, by the dyspnœa which is diminished, but which has not disappeared, that the affection of the heart can be still recognised. If in this state we make the patient take a little exercise, we often see all the different local signs previously observed reappear all at once, and with great intensity.

In fine, it may happen, as we have already said, and as we have also exemplified, that there is not even much dyspnœa, and that dropsy remains the only sign of heart disease. What is the value of this separate sign? If in this case the ascites is the first serous congestion which has manifested itself, we may be certain that it is not connected with a disease of the heart. If the dropsy commences, on the contrary, in the extremities, and particularly in the lower extremities, we may still dread the existence of a commencing lesion in the central organ of the circulation, but nothing strictly proves it. In the case where the dropsy commences in the peritoneum, it is nearly certain that its cause should be referred, either to a latent inflammation of this membrane, or to some disease of the liver. On the contrary, if it manifest itself first in the lower extremities, the heart may be intact, and the obstacle to the circulation may reside in a total or partial obstruction of the abdominal vena cava. We do not speak here of aneurisms of the aorta, which have also been considered as producing dropsy ; for experience has taught us that it is only in some degree exceptionally that these aneurisms give rise to collections of liquid either in the cellular tissue or in the serous membranes. In fine, in some individuals (the number is to be sure but small), the study of the symptoms and the *post-mortem* examination have not discovered to us any species of appreciable alteration, present or past, to which the dropsy could be referred, which in this case must be called *essential*, that is, *unaccompanied by any visible lesion.*

In the number of those dropsies called essential, or at least regarded as such from the symptoms, we shall place those which frequently occur after scarlatina. It cannot be said in this case, that the dropsy is the result of the irritation of the skin communicated to the subjacent cellular tissue ; for, 1st, it is some time after the disappearance of the exantheme, when the epidermis is desquamating, that the first traces of dropsy begin to appear ; 2d, the latter manifests itself indifferently, both in the parts where the skin was reddest, and in those where it scarcely lost its natural colour; 3d, we have seen it commence in a part remote from the skin — for instance, in the peritoneum, without there being any appreciable sign of inflammation of this membrane. If it were necessary for us to give an opinion on the probable cause of this remarkable species of dropsy, we would ask whether it may not be admitted, that during scarlatina, and after it, during the period of desquamation, the exhalation which ordinarily takes place on the surface of the skin is not suspended, and whether then the serum which no longer escapes through the skin in the form of insensible transpiration may not be deposited, more or less modified in its nature, either into the exhalant areolæ of the cellular tissue, or into the serous membranes ; this is what happens in a thousand other cases, one secretion supplying another. What would lend additional weight to this mode of viewing the matter is, that the dropsy manifests itself after scarlatina, principally when the patients are not kept warm during

convalescence, when they are exposed to the influence of a moist atmosphere. If our opinion does not appear divested of all probability, we would ask, in fine, whether one of the best means of preventing this appearance of the dropsy after scarlatina would not be to excite a moderate fluxion towards the intestines by means of purgatives, as was the practice of the ancients. These are conjectures which we submit to the consideration of practitioners.

We met seven cases of this kind at the La Charité. The patients were all young: some plethoric, and of strong constitutions; others weak, and of a lymphatic temperament. The scarlatina no longer existed in any of them at the time of their entering the hospital, but in several of them the skin was still covered with broad scales of epidermis. Four of them told us that they were scarcely free from the fever, when they went out and exposed themselves to a cold air; a fifth had inhabited, during his illness, a low moist room; the two others had not been subjected to any of these mischievous influences. In all the dropsy had not begun to manifest itself till from six to ten days after the disappearance of the redness of the skin; only one of them had been purged; with three of them copious bleedings had been employed during the progress of the scarlatina. Sometimes the dropsy commenced in the face, sometimes in the lower extremities, sometimes in the abdomen. In two cases there was but anasarca; in the five others there was anasarca and ascites at the same time. The termination was uniformly favourable, but it was a long time before the dropsy disappeared; it lasted, on an average, from fifteen days to two months. Some were treated with purgatives continued for several successive days, so as to establish a permanent diarrhœa. Three of them were treated in this way; in two of them nothing of any bad consequence occurred; on the contrary, the establishment and continuance of the intestinal flux seemed to contribute to the hastening of the absorption of the serous collections; but in the third, who was possessed no doubt of more acute sensibility, fever was lighted up, the tongue became red, the dropsy at the same time became very much increased. The purgatives having been suspended, all these symptoms soon ceased, and the dropsy, left to itself, was absorbed. Three other patients were treated with diuretics. Several blisters were also applied to the lower extremities, and fumigations were employed several times a day with juniper baths. In fine, in another patient who was pale, weak, and as it were bloodless, bitters were principally employed, and particularly quinquina given alternately in the form of syrup, decoction, and extract. A sensible improvement in the strength and in the appearance of the countenance, followed the employment of these remedies, and the absorption of the dropsy appeared one of the happy results. We should conclude from these different facts, that here, as on a thousand other occasions, the treatment cannot be uniform, that it must vary according to a great number of individual circumstances, which clinical experience alone can teach us to determine and appreciate.

We shall now cite some other cases of dropsy, in which pathological anatomy showed us no species of organic change which could account for it.

In several women labouring under cancer of the uterus, we observed during the last months of their lives an infiltration of the entire subcutaneous cellular tissue. This anasarca set in gradually; it usually made its first appearance either towards the lower part of the legs, or in the hands, or in the face. On examining the body, we found in no organ any appreciable change to which the leucophlegmatic state could be referred.

A woman, twenty-four years of age, who had been confined eighteen months before, was affected with anasarca and ascites when she entered the La Charité. The first traces of this dropsy manifested themselves a little time after her confinement, and without the patient experiencing any pain either in the abdomen or

elsewhere. This woman become gradually exhausted, and died the fourth month after her admission, without any symptom having ever announced in her a lesion of any organ. On opening the body, the peritoneal cavity was found filled with an enormous quantity of limpid serum, without the least admixture of flocculi, or any appearance of pseudo-membranes of either ancient or recent formation. *All the organs were found healthy.* One circumstance alone struck us — the almost complete absence of blood. Thus, not only the large arterial and venous trunks contained but a very small quantity of reddish liquid, but the tissues also, such as the intestine, the liver, and the lungs, which are ordinarily found engorged, and where the principal part of the blood appears to be accumulated during the last struggle, or immediately after death, these tissues, I say, or these organs, were entirely colourless and *bloodless*.

In another woman, fifty years of age, there was anasarca and ascites for the last fifteen months, when she entered the hospital. Neither did this patient present symptoms of a local affection any more than the preceding ; like her, she pined away gradually and died. Neither was there any lesion found here which could be regarded as the cause of the ascites. All the organs were healthy, except the stomach, the mucous membrane of which was very much softened towards the great cul-de-sac.

A man, twenty-two years of age, who usually resided in the country, had enjoyed good health up to the April of 1821. Then, without any known cause, without pain, his abdomen became considerably increased in size, it went on increasing very much during the following months, and at the same time the lower extremities became œdematous. Towards the end of July, subsequently to the spontaneous establishment of an abundant diarrhœa, the patient told us that his abdomen all at once became diminished, and the infiltration of his limbs disappeared. But in a short time, notwithstanding the continuance of the diarrhœa, the *swelling* reappeared as much as before ; up to the end of October he had diarrhœa, and his debility was constantly increasing. The patient entered the hospital the beginning of the month of November, 1821. At that time his countenance was pale and puffed : the abdomen, completely free from pain, was the seat of an evident fluctuation, and the lower extremities were very œdematous. The breathing was free ; the chest, when percussed, sounded well in every part ; auscultation pointed out nothing unusual either in the respiratory murmur, or in the pulsations of the heart ; the pulse was small and a little frequent ; skin not hot. The patient usually had from eight to ten stools every twenty-four hours, consisting of a substance resembling colourless water a little turbid, which was neither preceded nor accompanied by any sort of pain. He complained of being always cold. The urine was very scanty, and still *aqueous*, *limpid*, and *free from deposit*.

Four or five days after the patient's admission, 10th November, incisions were made in both thighs ; a considerable quantity of serum flowed from them. The purging still continued. On the 11th and 12th, a glass of the decoction of catechu was ordered to be added to his drink, and juniper fumigations. On the night of the 12th, a considerable increase in the purging. On the 13th, there was painful redness around the incisions. On the 14th, the right thigh became the seat of considerable erysipelatous inflammation, which affected all the upper and inner side of it. The pain felt by the patient in this part was so severe as to force him to scream. An attempt was made to moderate the purging by a starch lavement, with the addition of two drachms of diascordium and twelve drops of Rousseau's laudanum. The evacuations were less frequent during the twenty-four hours following. On the 15th the erysipelas spread ; the entire thigh was hard and painful. The bursæ were very much swollen from the preceding day. Pulse very frequent and small, skin hot.

Nov. 16. The purging returned as severe as before ; the skin of the right thigh and of the scrotum of a cherry-red colour ; tongue dry ; countenance very much changed ; despondence.

17th. Broad eschar on the inner and upper part of the thigh, around it a brown redness of the skin. The erysipelas extended to the anterior part of the abdomen, from the right thigh to the level of the crest of the os ilium. Internally it terminated abruptly at the linea alba. The infiltration of the face was gone, the features were very much changed. The patient was anxious for his dissolution, which he considered as near at hand ; his intellect was intact ; his breathing not more than ordinarily embarrassed ; the pulse very small and extremely frequent. In the course of the day the patient became more and more exhausted, and died on the 18th.

Post-mortem. The brain and its appendages remarkably pale. Lungs of a yellowish-white. Heart and its appendages, which presented all the conditions of their physiological state, contained but very little blood ; the substance of the heart pale. Peritoneum filled with an enormous quantity of lemon-coloured serum perfectly limpid ; no trace whatever of previous peritonitis. The intestines externally void of colour, seem, as it were, washed in serum ; mucous membrane of the stomach pale and thin ; all the internal surface of the intestine remarkably pale, except at the end of the transverse colon, and in the descending colon, where there was a vascular arborisation seated in the mucous membrane. Liver not large, and without colour. Spleen small and firm. Veins remarkable for the extreme paleness of their tissue. The different muscles were also colourless, and, as it were, wasted.

This case is remarkable in more than one respect. First it affords us the example of a dropsy of long standing, which could not be referred to the appreciable alteration of any organ.

What seems to us no less worthy of consideration, is the very small quantity of blood found in the dead body. We do not here allude to the empty state of the heart and of the large vessels, that being a thing of ordinary occurrence, but the capillary vessels of the different parts of the body, of the brain, lungs, liver, kidneys, intestines, of the parenchyma of the heart, of the substance of the muscles, were equally empty ; in a word, it might be said to be the body of a person who died of hemorrhage. There really was no blood but in two places : — 1st, in some vessels of the mucous membrane of a small part of the colon ; 2dly, in the skin of the right thigh, where the erysipelas appeared. Thus, then, we here again find the same coincidence as we already remarked above, between a considerable diminution in the mass of blood, and the existence of what is called essential dropsy. A popular saying has consecrated the belief that, in dropsical subjects, the *blood is turned into water*. This is essentially false in a great number of cases, since there are some dropsies whose existence is connected with a too great quantity of blood, as is the case in many diseases of the heart. But here the case is certainly different : first the liquids which are formed from the blood, the bile and urine in particular, appear to be secreted but in extremely small quantity ; there is nothing even to prove that bile is produced ; if, again, there is blood in the different tissues, it is at least certain that this blood is in a particular state ; that it is deprived of its colouring matter, and that if it still contain fibrin, the latter substance has lost the property of coagulating, and that it is dissolved in the superabundant serum which is everywhere the predominant chemical constituent.

We have dwelt on these facts, because they seem to us of the greatest importance in a therapeutical point of view. If it can be demonstrated, that in a certain number of cases there is really a connexion between the state of the blood and the formation of several dropsies, it follows that the treatment should be directed to bring back the blood to its natural state : such should be the indica-

tion: it would then be for experience to decide whether this indication can be fulfilled. It would, in fact, be necessary to remake the blood, if we may be allowed to say so; but that would be to fall into *humorism*. What matters it, if facts lead us to it?*

Another remarkable circumstance in this case is the very slight alteration presented by the intestinal mucous membrane in an individual affected for a long time with severe diarrhœa. Did it not appear, that in this case, there was transudation of serum on the internal surface of the intestines, as took place in the areolæ of the cellular tissue, and in the cavity of the peritoneum?

In a word, in the midst of this state of anemia, a sanguineous congestion nevertheless took place in the part, where incisions having been made to give exit to the serum, caused a slight irritation; a proof, among a thousand others, that the production of inflammation does not depend on a state of plethora, and that in more than one case, as has been already said, when there even remained but a single drop of blood in the system, it flowed towards the irritated point. It may be here observed, *en passant*, that this is one of the great objections, which may be made to the method generally adopted in France, which consists in combating every inflammatory process merely by bloodletting more or less copious. It is very certain, however, that if by this means a momentary disgorgement be effected in the inflamed part, we do not at all destroy in any way the unknown cause, under whose influence the blood subtracted from the ordinary laws of the circulation, tends to accumulate incessantly in the part where the process of inflammation exist.†

What must not be lost sight of is, that in our patient the erysipelas had scarcely commenced when the skin, which was the seat of it, became brown and gangrenous.

In the different cases which we have cited, the serous congestions had lasted several months before they were followed by death, and were developed only by degrees. Here was another case in which the dropsy, equally essential, in as much as no organic change could account for it, assumed a much more acute progress. Further, the pleuræ in this case having become the seat of a double serous congestion, the result was rapid death, in consequence of the constantly increasing embarrassment of the respiration.

A girl, twenty years of age, entered the hospital (in the autumn of 1825) in the following state: — considerable puffiness of the face; infiltration of the cellular tissue of all the surface of the body; ascites ascertained by the size of the abdomen and by fluctuation. Lies on her back. Respiration short and hurried. The œdema of the parietes of the thorax renders quite unavailing the information which might be afforded by percussion; but posteriorly on the right, nearly on a level with the inferior angle of the scapula, we heard, in a very marked manner, 1st, the bronchial respiration without the admixture of any râle; 2d, the œgophony, or at least a resonance, a peculiar trembling of the voice, which exists in no other part. Nothing indicates a morbid state of the heart. Pulse also natural. This girl assures us that she has been ill but for the last fifteen days: she remarked that her face and limbs became swollen without any known cause; by degrees this *swelling*, at first sight, became more and more considerable. She felt her breathing embarrassed but for the four or five

* At the time I wrote these cases, everything, which tended to fix the attention on the part performed by the blood in the production of disease, still seemed a strange paradox. Since that time we have progressed, and facts similar to that which inspired these reflections in 1825, have been often cited and interpreted in the same way. These facts now seem to have become more general, because new theories have directed the researches of observers to that channel.

† I have developed this point of doctrine, when treating of *hyperemia*, in my *Pathological Anatomy*.

last days. (Blisters to the legs, stimulating frictions on the extremities : diuretic drinks.)

During the three weeks following, the state of the patient underwent no kind of change ; then the dyspnœa increased all at once in a very perceptible manner, and *we recognised posteriorly on the left as well as on the right bronchial respiration and œgophony.* However, the dyspnœa increased, and the patient soon died in a state of asphyxia, having retained the use of her intellects up to the last moments.

The *post-mortem* examination proved the existence of a considerable effusion of serum into each of the pleuræ ; nothing else announced that these membranes had been the seat of any inflammatory process. The pulmonary parenchyma, compressed by the effusion was sound. The heart presented no appreciable alteration ; the vessels which enter it, as well as those arising from it, were in their normal state. A considerable quantity of black blood was found in the large veins.

In the abdomen, the peritoneum contained some limpid serum, without any trace of inflammation. The liver, spleen, and pancreas appeared quite sound. There was nothing remarkable in the digestive tube, except a considerable development of the mucous follicles at the end of the small intestine, which exhibited the appearance of small whitish granulations. But there was another organ which presented a change, which must not be lost sight of ; that organ was the kidneys, of which the external cortical and part of the tubular substance consisted merely of a whitish granular tissue, divided into small masses or grains, which were separated by the remains of the reddish tissue natural to the kidney. In several points, however, some cones of the tubular and mamillated substance were observed to be still intact. Did this particular alteration of the kidneys cause any obstacle to the free secretion of the urine, and consequently contribute more or less directly to the production of dropsy ?* Be that as it may, this was the only species of lesion revealed to us by the *post-mortem* examination. But if the cause of the disease is here at least very obscure, the cause of death is on the contrary sufficiently evident, it being evidently owing to the double hydrothorax.

The different facts now cited prove, then, that there may be dropsies which recognise other causes than an inflammatory process, or a mechanical obstacle to the circulation.

ARTICLE IV.

LESIONS OF THE HEART DISCOVERED BY AUSCULTATION.

29. We shall here follow the beautiful division pointed out by Laennec, which consists, as every one knows, in studying, by auscultation, the beats of the heart with respect to their impulsion, their sound, their extent, and their rhythm.

The impulse communicated to the cylinder by the pulsations of the heart, is most frequently limited to the precordial region. However, we have more than once ascertained its existence, either at the base of the sternum, or even in the epigastrium, and as far as the umbilicus. This impulse does not always remain uniform with respect to its intensity, or the points where it takes place. A blacksmith, twenty-eight years of age, was subject for several years to fre-

* The state of the kidney, noticed in this case, has been described, since the publication of the first edition of this work, under the name of granulations of the kidney, by Dr. Bright, an English physician, who, more positively than I did then, considers this case as the cause of a certain number of dropsies.

quent palpitations; when he entered the La Charité, the epigastrium was observed to be forcibly raised at each beat of the heart; the cylinder, applied over this region, was repelled during each contraction of the heart, so that the head of the observer was raised several lines each time, which raising was visible at the distance of several feet. A strong impulsion also existed at the lower part of the sternum and in the precordial region; the pulsations of the heart were heard, moreover, in all parts of the thorax. These phenomena continued for several days; then the impulse at the epigastrium lessened first, and afterwards was no longer perceptible; it became even much less marked in the region of the heart. It is to be observed that the pulse, which was extremely small and irregular, as long as the pulsations of the heart gave considerable impulsion, became stronger and more regular, according as this impulsion became weaker, and was circumscribed to the precordial region.

What sort of lesion is indicated by the impulsion communicated to the cylinder by the beats of the heart? We have very frequently ascertained that, as M. Laennec has stated, the existence of this impulsion is connected with hypertrophy of one or more of the heart's cavities; but, on the other hand, every hypertrophy of the heart does not necessarily produce it. More than once, in cases where after death we found the parietes of the ventricles very much thickened, at the same time that their cavities were considerably enlarged, we detected during life no species of impulsion. In other cases, where there was simple hypertrophy of the left ventricle, with great diminution of its cavity (the concentric hypertrophy of MM. Bertin and Bouillaud), there was no appreciable impulsion. It seems then, that in order that the latter may be produced, it is not only necessary that the parietes of the heart should be increased in thickness, it is also necessary that their fibres should contract with a certain degree of energy; now, the latter condition does not result necessarily and solely from the increase in the thickness of the muscle, as we have already mentioned. This is so true, that mere palpitations in nervous or plethoric individuals, palpitations which are independent of all organic lesion of the heart, sometimes, however, give rise to a strong impulsion, which ceases with the palpitations. Still more, there are even cases of real hypertrophy, in which the impulsion shows itself only at intervals more or less distant, either without any appreciable cause, or under the influence of an irregularity of diet, stimulating medicines unseasonably administered, the attack of an acute inflammation of any organ, unusual exercise, some mental emotion, &c.

In certain individuals labouring under an organic affection of the heart, there is heard, either in the precordial region, or at the lower part of the sternum, a particular sound, the different varieties of which have been designated and described under the name of *bruit de soufflet*, or *bruit de râpe*. The frequent existence of this sound cannot be questioned; but what does it indicate? It is quite certain, that in a number of cases its existence coincides with that of an obstacle to the free passage of the blood through the different orifices of the heart. According to the place where this sound is heard, and the moment of the heart's contraction at which it is perceptible, the precise seat of the obstacle may sometimes even be assigned. But, on the other hand, on more occasions than one, we have heard no trace of a bruit de soufflet, in cases where some one of the orifices of the heart presented a narrowing almost similar to that which we found under other circumstances, where a very manifest bruit de soufflet had been heard during life; at other times, again, the orifices of the heart were in their normal state, and yet the bruit de soufflet was heard. Thus, it was very well-marked in a case where we found no other lesion in the heart than a hypertrophy of the left ventricle, with extreme smallness of its cavity. In another person the cavity of the ventricle was, on the contrary, dilated. In another, where a well-marked bruit de soufflet existed equally in the precordial region

and towards the lower part of the sternum, the heart had acquired an enormous size. The parietes of the left ventricle were thickened, and its cavity so enlarged that it might have admitted a pullet's egg. The left auricle presented nothing remarkable. The auriculo-ventricular orifice of this side had its ordinary diameter, and presented no lesion in other respects. The aortic orifice was equally exempt from all alteration ; cartilaginous patches were beginning to be deposited towards the arch of the aorta. The ventricle and auricle of the right side were considerably dilated ; the parietes of the ventricle were become thin. The orifices of this side were in other respects perfectly free. A great quantity of blood filled the four cavities of the heart.

Thus, then, the existence of the different degrees of the bruit de soufflet is not necessarily connected with the existence of an obstacle to one of the orifices of the heart, since on the one hand this bruit exists without any obstacle, and on the other hand, it does not always take place when an obstacle does exist. Even when this sound does manifest itself, it is not heard constantly and uniformly ; oftentimes, for example, being very well-marked at the time the patients enter the hospital, when the disturbance of the circulation is very great and the dyspnœa considerable, it then becomes less perceptible, and subsequently disappears altogether.

What are we to conclude from these different facts ? It is, that the production of the bruit de soufflet depends most frequently on the union of several conditions. The first of these conditions seems to us to be a quantity of blood, more considerable than usual, which in a given time passes the orifices of the heart; we have even sometimes heard the bruit de soufflet in plethoric individuals, who in other respects presented no sign of organic affection of the heart ; some women of sanguineous temperament present it in a very marked manner on the return of each menstrual period. This being laid down, we may conceive that this bruit de soufflet should be more easily produced in the case where either ossification, or any other case, narrows one of the orifices of the heart; but we may also conceive how, even in this case, the sound may diminish or disappear under the influence of rest, diet, or after removing a certain quantity of blood. If, notwithstanding these means, the bruit de soufflet continue, if it resemble the sound produced by the action of a rasp, it may then be concluded that there is a real narrowing of one of the orifices of the heart, occasioned probably by considerable ossification. We have never heard the bruit de râpe, properly so called, except at the precordial region, whilst the different degrees of the bruit de soufflet are heard with nearly equal frequency on the right and left, which corresponds with the much more common existence of ossifications on the left than on the right.

It is not only in the heart that the species of bruit de soufflet now mentioned is heard. A sound more or less analogous is sometimes heard in the different arteries during their dilatation, or, in other words, every time they receive a new supply of blood from the heart ; we shall cite two cases of this kind, wherein there shall be found some of the signs which have been considered in later times as connected with arteritis. (Bertin and Bouillaud.)

A man, forty-seven years of age, experienced for the last fifteen months an habitual pain in the back between the two shoulders, and along the vertebral column as far as the sacrum : at other times it extended to the extremities ; and at last, at intervals, when the dorsal pain was severe, the epigastrium likewise became painful. During the two months previous to the entrance of this patient into the La Charité, the pains were acute, and he often had attacks of dizziness. When he was submitted to our examination, the state of the circulating system particularly engaged our attention ; the cylinder, being applied over the region of the heart, was slightly repelled ; but further in this same region there was heard a well-marked bruit de soufflet, which appeared to follow immediately

each contraction of the ventricles; but this sound was not confined to the heart; it was also heard very distinctly, 1st, in the epigastrium, along the median line from the xiphoid cartilage to the umbilicus; 2d, all along the cartilages of the ribs on the right side; 3d, along the course of the two primitive carotids, which at their lower part presented to the hand a very loud bruissement, and to the eye pulsations very energetic; 4th, this same bruit de soufflet was again heard, but more feeble, posteriorly along the vertebral column, particularly towards the middle of the dorsal region; the pulse was hard, and vibrating. The patient, however, felt no oppression; he could lie on his back, and indifferently in all positions; he never had any appearance of dropsy; the respiratory murmur was every where strong and distinct. This person remained but ten days in the hospital, and left it in the same state as when he entered.

What was particularly remarkable in this individual was, that this extraordinary bruissement, occasioned by the large arterial trunks, as well as that which existed in the region of the heart itself, did not coincide with any other of the ordinary symptoms of the organic affections of the heart; in the following cases, on the contrary, we shall find a similar bruit in the arteries, coinciding with dyspnœa and a commencement of dropsy.

A young English servant girl felt acute pains in the two knees, with swelling of those parts, towards the end of the winter of 1822. After having continued for some time, these pains disappeared, and were succeeded by a particular feeling of constriction in the precordial region, with considerable dyspnœa. She then entered the La Charité, and presented the following symptoms: lying in the horizontal position very painful, in consequence of the great dyspnœa which results from it: respiration short and hurried; speech panting; pulsations of the heart heard with impulsion and a well-marked bruit de soufflet, 1st, in the precordial region; 2d, at the lower part of the sternum, and in the epigastrium. On applying the cylinder all along the back, over all the posterior part of the thorax on the left side, and over the carotids, the same bruit de soufflet was heard as in the region of the heart; pulse frequent, regular, and vibrating. The eight days following, the same signs were afforded by auscultation, increase of the dyspnœa, which became so severe as to cause us to fear lest the patient may be suffocated; œdema of the lower extremities. (Copious bleedings, sinapisms and blisters applied alternately over different parts of the body, &c.) In consequence of the constantly increasing intensity of the symptoms, the prognosis became more and more unfavourable; however, the bruit de soufflet of the arteries and heart became less marked, then ceased altogether; the impulsion communicated to the stethoscope by the pulsations of the heart was also considerably diminished, and was no longer perceptible at the epigastrium; at the same time the embarrassment of the circulation became less; she could now lie in the horizontal position; the infiltration of the lower extremities disappeared. About six weeks after her admission this young patient presented no other morbid phenomenon than a little dyspnœa, and a slight impulsion in the precordial region; she left us in that state.

Three years after, during the summer of 1825, this woman again came to the hospital. Since her leaving it she had enjoyed, she told us, tolerable health, and only a few days before her return to the hospital she was seized with the same series of symptoms as in 1822. The bruit de soufflet was very manifest at the heart, along the sternum, in the epigastrium, in the back, and along the carotids. The dyspnœa was less than on the former occasion. These different symptoms continued for some time, when the patient went out again in good health.

On what species of lesion did the remarkable symptoms depend, experienced by the two individuals, whose cases we have now related? Here many conjectures might be made, without our arriving at any thing positive; we prefer

to leave these facts to the consideration of medical men, without attempting to establish their diagnosis.

There is often a well-marked difference between the two sides of the heart, with respect to the impulsion which accompanies its contractions, and in reference to the sound which is heard ; thus, the existence of either of these phenomena in the precordial region, at the lower part of the sternum, or even in the epigastrium, often points out with precision whether the organic lesion is seated in the right or left cavities. This becomes more particularly remarkable when the heart is scarcely heard in the precordial region, whilst its pulsations are heard with a sound and impulsion on a level with the last piece of the sternum, and towards the xiphoid cartilage, where in the physiological state they are scarcely perceptible. One of the most marked cases of this kind which we have had an opportunity of observing, was that of an individual in whom the heart presented no other lesion than enormous dilatation of the right auricle, with slight hypertrophy of its parietes. The hand applied over different parts of the thorax detected nothing unusual in the pulsations of the heart ; when examined by auscultation, these pulsations presented nothing anormal in the precordial region ; they were not heard under the left clavicle ; but towards the lower part of the sternum each contraction of the heart, more perceptible than in any other part, enabled us to hear a peculiar sound very like that of a valve.

The rhythm of the heart's pulsations, as every body knows, oftentimes loses its regularity in the organic affections of this viscus. What is denoted by this irregularity, which sometimes affects the strength, sometimes the return of the pulsations? Does it always denote, as many persons think, the existence of an obstacle at one of the orifices of the heart? Let us first remark, that in several cases of pericarditis, also, the heart presents very irregular pulsations, and that still there is no obstacle at the orifice of this organ. Let us not forget that during a crowd of diseases, in those particularly where the action of the nervous centres is more or less modified, the heart equally presents irregularities and well-marked intermissions. From these facts we may conclude, *à priori*, that in cases where the heart's nutrition is deranged from its normal state, this sole circumstance may, as well as those just now mentioned, account for its irregular contractions: that becomes much more probable, if we recollect that the different alterations of nutrition in the fleshy substance of the heart often coincide with an irritation, either acute or chronic, of the internal membrane, the influence of which on the muscle which it lines must be more or less similar to that of the pericardium. In fine, we may conceive how, in consequence of the single circumstance of blood flowing into the cavities which no longer have the proportions assigned them by nature to enable them to expel in a given time as much blood as they receive, the contraction of the parietes of these cavities may be modified, embarrassed, alternately retarded or hurried, and thus become more or less irregular.

This is what reasoning founded on analogy may induce us to suppose : let us now see what information facts afford us.

First, there are cases where, though after death no obstacle is found at the orifices of the heart, the pulsations of this organ have, however, presented great irregularity. But then it may be remarked, that this irregularity does not always exist; it manifests itself at intervals more or less distant, when, under the influence of any cause whatever, the contractions of the heart are hurried and the dyspnœa increases.

In other individuals there is an obstacle at one of the orifices large enough to impede the passage of the blood: thus, for instance, the aortic valves being ossified, and being thereby rendered in a great measure immoveable, there remains between them but a narrow orifice through which all the blood is to

pass, which is continually projected from the left ventricle into the aorta, and still the pulsations of the heart have not been irregular, or at least they have become so only at intervals or towards the termination of life.

At other times, in a word, and this is the most common case, the irregularity of the heart's pulsations is directly proportioned to the size of the obstacles which exist at the different orifices; usually, in this case, there is heard at the same time a more or less marked bruit de soufflet, de lime, or bruit de râpe.

Under some circumstances we have ascertained very marked intermissions in individuals, the orifices of whose heart were exempt from every obstacle, the heart itself being at the same time aneurismatic, but in whom the ascending thoracic aorta was traversed on its internal surface, either with ulcerations, or particularly with cartilaginous or bony inequalities. In this case, were the intermissions of the contractions of the heart independent of the morbid state of the aorta, or were they connected with the diminished elasticity of the fibrous tunic of the vessel?

It follows from these facts, that the existence of pulsations of the heart, irregular with respect to their strength or their return, may cause one to suspect the existence of a greater or less obstacle at one of the orifices, but cannot afford us complete certainty of it: there will be, however, a strong presumption in favour of the existence of this obstacle if the irregularity of the pulsations be constant, and particularly if it takes place before the organic affection of the heart has yet assumed a serious character.

With respect to the extent of the heart's pulsations, they have appeared to us to be in general proportioned to the size of this organ, and particularly to the dilatation of its cavities. Here, however, we must again remark, that in a considerable number of cases, where the *post-mortem* examination presented us an enormous heart, the extraordinary size of which was caused at one and the same time by hypertrophy of the parietes and dilatation of the cavities, the pulsations of the heart were heard only in a very circumscribed space, either merely towards the precordial region, or in this region, at the lower part of the sternum, and under the left clavicle.

From the different facts recorded in this article, we shall draw the following consequences with respect to the utility of auscultation in the diagnosis of organic affections of the heart.

There are some cases where auscultation furnishes signs which may powerfully contribute to establish this diagnosis; however, in order that these signs may have real value, they must combine certain conditions: they must be permanent, and more than that, they must be joined to other signs; for we lay it down as a principle, that there is not one of the signs furnished by the consideration of the heart's pulsations, of their sound, their rhythm, and their extent, which may not show itself, though the heart may be free from all organic lesion, under the influence either of acute pericarditis (see the article on this affection), or of a state of plethora, or of a modification of the nervous influx. The signs derived from auscultation, as all other signs in general, become then really characteristic, and acquire a true value only as far as regard is had — 1st, to the period and mode of their appearance; 2d, to the different morbid phenomena which have preceded, or which accompany them.

We have seen that the different signs furnished by auscultation to detect an organic affection of the heart, may develope themselves though this affection does not exist. But, on the other hand, it is no less certain that this affection may be very severe, and yet may not be detected by auscultation.

We consider it as an indubitable fact that, in several cases where the heart has acquired considerable size, or its cavities are very much enlarged, the ear applied over the precordial region, and over the other points of the thorax, hears nothing unusual in the pulsations of the heart, and even hears them less than in

the physiological state. Here, again, two classes of patients may be established. Some, at the time of their entering the hospital, present, in the precordial region, or elsewhere, pulsations unusual with respect to their strength, their sound, their rhythm, &c. But under the influence of a rational treatment, and particularly of repose, a primary condition of success in this treatment, the signs furnished by auscultation become less and less perceptible, and at last entirely disappear. Other patients have never presented any of these signs, except perhaps transiently, when they were affected with palpitation. Thus, then, it would be extremely wrong to deny the existence of an organic disease of the heart, because it is not actually disclosed by any local sign, and particularly by the signs furnished by auscultation, for the latter may never have existed or may have disappeared.

To sum up, the method of auscultation has no doubt thrown great light on the diagnosis of diseases of the heart; it often gives useful and valuable information, and we never should neglect to have recourse to it. But alone, and unaided by other signs, it can but seldom discover with certainty the existence of these diseases, no more than it can, in a very great number of cases, discover of itself the existence of tubercles of the lung, or even of an acute inflammation of this organ. Certainly nothing can be farther from our thoughts than a wish to depreciate the method of auscultation, one of the most splendid and ingenious discoveries which have been made in medicine for a long time. On the contrary, we are endeavouring to render it more useful and of more practical application by not exaggerating its advantages, and by pointing out with precision what may be expected from it.

SECOND BOOK.

DISEASES OF THE LUNG.

SECTION I.

DISEASES OF THE BRONCHI.

30. We do not intend to give here a complete description of these diseases; that would be a useless repetition of what is to be found every where. We would merely strive to call attention to some important points in the history of these diseases, which are sometimes so slight that they scarcely constitute a morbid state, whilst they sometimes equal in severity an acute pneumonia or a pulmonary phthisis. In a first article, we shall speak of the more or less remarkable lesions, excited in the parietes of the bronchi by acute or chronic inflammation. A second article shall be devoted to the exposition of the different changes, which the liquid, secreted by the mucous membrane, undergoes in quantity and quality.

We have adopted this division, because it will allow us to explain better a certain number of important symptoms, some of which are more particularly owing to an alteration of texture in the parietes of the bronchi, whilst others depend more particularly on the different modifications of the liquid which they supply.

CHAPTER I.

ORGANIC ALTERATIONS OF THE BRONCHI IN THE STATE OF INFLAMMATION — SYMPTOMS OF THESE ALTERATIONS.

31. When the bodies of persons are opened, who have died of any disease whatever, during which they were affected with a mild and recent bronchitis, there is found some redness in a circumscribed portion of the mucous membrane. This redness is particularly met towards the termination of the trachea, and in the first divisions of the bronchi. If the inflammation has been more intense, the redness extends to a greater number of tubes; it exists particularly in some of the smaller ramifications. It often happens that this redness is exactly limited to the bronchi of only one lobe; it is the bronchi of the upper lobe which appear to be more particularly disposed to become inflamed. The red colouring of the bronchi sometimes presents itself in the form of a fine injection, which seems to exist simultaneously both in the sub-mucous cellular tissue, and in the mucous membrane itself; sometimes vessels are no longer distinguished, but only a number of small red points, crowded together, and collected around each other; sometimes, in fine, there is observed a uniform red colour. In some, the redness goes on diminishing progressively from the large bronchi towards the small ones; in others, the reverse takes place. Oftentimes the redness exists only at intervals, in the form of bands or separate patches, which constitute, as it were, so many circumscribed inflammations, between which the mucous membrane is white and healthy; a form of inflammation similar to that so frequently observed in the intestines.

These differences in the extent and locality of the inflammation cause great differences in the symptoms. Confined to distant points of the mucous membrane, the inflammatory redness of the bronchi remains a slight affection, and cannot bring with it any dangerous consequence. The case is not the same, however, when it has extended to a great portion of the respiratory tree; then more serious consequences accompany it. The cough which it occasions is painful; the sputa consist, at the period when the disease increases, of a viscid transparent substance, mixed occasionally with streaks of blood; the oppression is often considerable; the patients feel, in different parts of the chest, deep-seated pains, which, in certain cases, approach the surface, and might be mistaken for pleuritic pains: there exists at the same time intense febrile disturbance. Certainly, such a group of symptoms might readily impose on one for an inflammation of the pulmonary parenchyma. If the chest be percussed in such a case, it will be found, to be sure, that the sonorousness of its parietes has not undergone any change, which would not exclude the idea of a pneumonia in the third stage; but if we auscultate, we shall find, in a great number of points of the thorax, sometimes all over it, a crepitating râle, similar to that which is also heard in pneumonia; the reason is that in the two diseases the same cause produces it, namely, the presence within the finest of the bronchial ramifications of a viscid mucus, which is traversed by the air at each inspiration; this same râle might also be very perceptible during the time of expiration.

The crepitating râle exists therefore in other diseases besides pneumonia: it equally belongs to inflammation of the bronchi, when the inflammation has extended to the capillary branches of these tubes. Most frequently this râle continues only as long as the very acute bronchitis is accompanied with fever. There are cases, however, where after the latter has disappeared, the crepitating râle still continues, and thus it may last a very long time, even when the disease has become altogether chronic.

32. When the inflammation is chronic, the mucous membrane generally loses its bright redness ; it presents a livid, purple, brownish tint. In fine, what is very remarkable is, that in persons presenting all the symptoms of an inveterate chronic bronchitis, with puriform expectoration, we have found the mucous membrane of the air passages scarcely of a rose colour, or even perfectly white through all its extent. Bayle had already noted this fact in the 49th Case of his work, with respect to a case of chronic bronchitis which simulated phthisis : he states that the mucous membrane of the trachea and bronchi appeared healthy ; it was white and scarcely thickened. *This white state of the mucous membrane*, he adds, *is not rare in chronic pulmonary catarrh.* We should not, in our opinion, hence infer, that inflammation does not or did not exist. We found, in fact, this absence of redness in other organs where the existence of inflammation could not be doubted. Thus serous membranes filled with pus, and lined with false membranes, frequently present no change of colour, no appreciable alteration in their texture, which puts it out of doubt that there are tissues which may be inflamed without being reddened. The intestinal mucous membrane, though traversed with numerous ulcerations, often presents a remarkable paleness, either in the very place where these ulcerations exist, or in their intervals. More than once in individuals, whose urine was for a long time purulent, the mucous membrane of the calices and pelvis of the kidney, as also of the ureters, and bladder, has been found very white ; in these different affections of mucous tissues, an inflammatory process could not be called in question ; but whether by reason of its long standing, or in consequence of general debility, the inflammation appears to have left no other traces in the organ which was the seat of it, than a change in its secretion : thence very often result new therapeutic indications, as we shall show, when we come to consider the expectoration. The following case presents an instance of chronic bronchitis without redness of the mucous membrane.

Case 1.—Chronic bronchitis simulating pulmonary phthisis—Whiteness of the tracheo-bronchial mucous membrane.

A locksmith, twenty-seven years of age, entered the La Charité during the month of December, 1821. For the last two years this man had been tormented with a constant cough ; he had never spit blood. When we saw him, he was in a state of marasmus ; he expectorated sputa, formed of greenish, round patches, separated from each other, and floating in an abundant serum : these sputa were inodorous, and appeared to the patient to have a saccharine taste. The respiration was a little short ; he could lie down in all positions ; the chest when percussed resounded equally well in all parts : some mucous râle was heard in different points ; there was no appearance of pectoriloquy ; the pulse which was free from frequency in the morning, became accelerated towards evening ; every night the patient perspired a little. The digestive functions presented nothing remarkable.

What diagnosis could be given here ? Auscultation informed us to be sure that there was no tubercular cavity ; but the aggregate of the other symptoms seemed to announce, that numerous tubercles, commencing to soften, existed in the lungs.

The marasmus, and debility increasing, and diarrhœa also supervening, together with disturbance of the intellect, the patient died in a half comatose state.

Post-mortem. Seroso-purulent infiltration of the subarachnoid cellular tissue of the convexity of the hemispheres ; lateral ventricles distended with turbid serum.

Pulmonary parenchyma sound, slightly engorged. The internal surface of

the larynx, trachea, and bronchi, traced as far as their smaller divisions, presented everywhere great paleness; the mucous membrane exhibited no other appreciable alteration; white fibrinous concretions distended the right cavities of the heart. The digestive canal, opened to its entire extent, presented no other lesion but a bright redness, scattered in patches over the great intestines.

If in this case the symptoms presented during life had not been known, and had the mucous membrane of the bronchi been examined without any previous information regarding the patient's state, it would have been unquestionably considered as very sound, and yet it was seriously affected; it was, in consequence of its very important lesion, and of the vitiated secretion of which it was the seat, that the patient was brought, in the space of two years, to the last degree of marasmus, presenting all the rational symptoms of phthisis. Pathological anatomy is then sometimes insufficient to discover the morbid state of the organs. Let us never lose sight of these two great truths, that, on the one hand, necroscopic researches oftentimes disclose lesions of which the symptoms had not excited any suspicion, and that, on the other hand, these same symptoms do not permit us to doubt that an organ may be at times very seriously altered, though it may not appear so at the *post-mortem* examination.

We again see in this case an additional proof of the difficulty of distinguishing a simple chronic bronchitis from a tubercular degenerescence of the lung. What can auscultation tell us in this case, except that there are no cavities? Let us draw from it this conclusion, that as long as the existence of tubercles shall not be ascertained by the stethoscope, the return to health should not be deemed impossible, by the cessation of the bronchitis, which occasioned all the symptoms. It is against such an inflammation of the mucous membrane of the air passages, that a great number of hygienic and therapeutic means have often succeeded which, if directed against real phthisis, would certainly fail, or at most would merely retard for a little the progress of the evil.

33. The inflammatory softening of the bronchial mucous membrane is much more rare than that of the gastro-intestinal mucous membrane. We have seldom found it so marked, as that the membrane could be raised into a pulp; it is very rare, too, to find this membrane ulcerated: and in this respect it again presents a disposition contrary to that of the gastro-intestinal mucous membrane. We have not detected ulcerations in the bronchi more than twice; in one of these two cases there was at the same time a large ulcer in the trachea, a little above its bifurcation; three small round ulcerations existed in the right bronchus, which results immediately from the division of the trachea: with respect to the lesion, this case resembles those detailed by M. Cayol, in his splendid work on tracheal phthisis. The symptoms had been those of a common chronic bronchitis. In the other case the trachea and first divisions of the bronchi presented but a slight redness, without any other lesion; but in the smaller ramifications of the right side the redness became very intense, and the mucous membrane presented on its surface a great number of small ulcerations, all exactly circular, and of equal size. Their edges were livid, and were raised about half a line above the level of the bottom of the ulcer, scarcely large enough to admit the head of a good-sized pin. The person in whom this lesion was detected had an aneurism of the heart. During his stay in the hospital he was tormented with frequent and very painful fits of coughing; his sputa were generally tinged with a little blood.

The frequency of ulcerations decreases from above downwards in the different portions of the mucous membrane of the air passages. Thus, ulcerated chronic laryngitis is common enough. It is not at all rare to find a part of the chordæ vocales stripped of mucous membrane, the thyro-arytenoid muscles and the cartilages exposed, to a greater or less extent, in persons who, affected with simple chronic bronchitis or pulmonary tubercles, had their voice for a long

time hoarse or entirely destroyed. What is remarkable is, that in the great majority of cases, these ulcerations exist only when there is at the same time inflammation of the lower parts of the mucous membrane of the air passages.

34. In the trachea ulcerations become less frequent than in the larynx; they are generally small, and not at all numerous. Once, however, in a person whom we saw with M. Magendie, who considered the anatomical specimen so curious that he preserved it, we found the entire inner surface of the trachea really like a sieve (*criblée*), from its origin to a little above its bifurcation, in consequence of a number of ulcerations so multiplied and so crowded on each other, that they occupied more extent than the spaces interposed between them. The bronchi were red, but not ulcerated. The patient had complained during life of a continual sensation of heat rather than of real pain all along the entire course of the trachea; each inspiration was accompanied with a remarkable hissing sound (*sifflement*), as if the air tube was compressed by some tumour.

Ulcerations of the trachea most frequently do not extend beyond the tissue of the mucous membrane; their edge is formed by the latter, and their bottom by the subjacent fibrous tissue. Sometimes, however, the ulcer is deeper, all the parts situated beneath the mucous membrane are destroyed from without inwards, and the result of this may be a complete perforation of the parietes of the trachea. We possess two cases of this kind. In both the perforation took place at the posterior part of the trachea, in its cervical portion. In one of these cases the bottom of the ulcer was formed by the œsophagus, which was united by a dense, close cellular tissue to the circumference of the solution of continuity. In the other case there was double perforation of the trachea and œsophagus, so that there was a free communication between these two tubes. This case of tracheo-œsophageal fistula was indicated only by an inconsiderable difficulty of deglutition, and by a trifling cough every time the patient swallowed; itself indicated that the obstacle to deglutition and the cause of the cough had their seat in the inferior middle part of the cervical region.

Perforation of the trachea, or of its first divisions, has been sometimes seen according to a course entirely the reverse of the preceding, to take place from without inwards; besides the aneurismal tumours which often produce this sort of perforation, tubercular lymphatic ganglions also sometimes produce it. This lesion, of which we know no instance in the adult, is not very rare in children; which is owing, no doubt, to the greater frequency of the tubercular degeneresscence of the lymphatic ganglions in the early period of life. These tubercular ganglions, according as they become soft, irritate the parietes of the trachea or bronchi with which they are in contact, and gradually cause their destruction from without inwards. The progressive course of this ulcerative inflammation may be followed in different subjects: thus, in some, we only find a close adhesion of the tubercular ganglions and tracheal or bronchial parietes, with redness of the latter, commencing destruction of the cartilages; in others, the cartilages no longer exist, the fibrous tunic has disappeared, and tubercular substance is found in immediate contact with the mucous membrane, which it pushes and raises before it. In fine, in an extreme degree, the mucous membrane is itself destroyed, and the tubercular matter, leaving the ganglion according as it softens, spreads over the air passages, from whence it is ejected by coughing. Tubercles developed in the bronchial ganglions may heal in this way in the same manner as tubercles seated in the subcutaneous ganglions. But, unfortunately, these tubercles of the bronchial ganglions very rarely exist without there being at the same time pulmonary tubercles.

These perforations of the parietes of the trachea very closely resemble the variety of intestinal perforation, which takes place as here from without inwards, and which is caused by sub-peritoneal tubercles.

Researches regarding the history of narrowing and obliteration of the bronchi.

The alterations pointed out in the preceding article are not the only ones presented by the mucous membrane of the bronchi, when it is attacked with acute or chronic inflammation; it may also become thickened, either in its entire extent or only in certain points. From this thickening, however inconsiderable it may be, there results a very important effect, that is, a diminution in the size of the cavities through which the air is to pass to enter from the trachea into the pulmonary vesicles. Now, the bronchi cannot be narrowed without the sound caused by the entrance of the air into these tubes being also changed; then there arises a peculiar râle, which in consequence of its seat and nature we call the dry bronchial râle, the two principal varieties of which were designated by Laennec by the names of râle sibilant and râle ronflant.

This râle is evidently owing to the circumstance of the air, in its way to the pulmonary vesicles, traversing tubes which are narrower than those which usually give passage to it; that is particularly the obvious cause of the sibilous râle. In its exit from the vesicles the air again finds the same obstacles to its free passage, which causes during expiration the same râles, scil. the râle sibilant and râle ronflant. There are even cases where they are heard only during expiration.

These râles exist habitually in a considerable number of persons affected with chronic bronchitis; the patients who present them have ordinarily a certain degree of dyspnœa, which from time to time assumes all at once a much greater intensity, and becomes changed into a real attack of asthma. If, during this increase of dyspnœa, the chest be examined with a stethoscope, it is found that the sibilous râle has become much more marked, and at the same time much more general; it again becomes weaker and more circumscribed, according as the oppression diminishes. There is no doubt but that in such circumstances the sudden increase of the dyspnœa depends on the increase of the habitual engorgement, of which the bronchial mucous membrane is habitually the seat; whence arises the diminution in the calibre of the bronchi, and consequent production of the sibilous râle. There are, in my opinion, several cases of asthma, which should be referred to thickening of the mucous membrane of the bronchi; in this case, the intensity of the dyspnœa is under the immediate dependence of the different degrees of engorgement of this membrane, and is equally variable with it.

In the cases now mentioned there exists an habitual state of inflammation of the bronchi, which becomes aggravated at intervals; but that is not the only case which may present itself. There are persons who ordinarily present no sign of bronchitis, who do not cough, who have no shortness of breath, and who at certain intervals, are suddenly seized with the following symptoms: oppression, which rapidly becomes most intense; imminent suffocation; violet injection of the face, as in persons in a state of asphyxia; pulse small, hard, and rather frequent; cough at first dry, but afterwards accompanied with a copious expectoration, the appearance of which coincides with the dyspnœa. These different symptoms set in suddenly; they very quickly attain their highest degree of intensity; then they diminish, and at the end of a few days they disappear, without leaving any trace behind them. What is the cause of this frightful dyspnœa, which thus seizes an individual in the midst of the most perfect health, which throws him all at once into unspeakable anguish, and threatens to kill him by asphyxia? Auscultation will explain it to us; it informs us, that from the moment the dyspnœa commences, there is heard in all points of the chest a general hissing sound (*sifflement*) which accompanies each inspiration, and which in certain cases is also heard in the larynx. In this latter organ, as

in the large and small bronchi, the sudden appearance of the hissing respiration can be explained in no other way but by the equally sudden engorgement of the laryngo-bronchial mucous membrane; thence the fit of asthma. In proportion as the oppression becomes less, the hissing sound (*sifflement*) of the respiration also becomes less loud and less general; then, when the expectoration takes place, this hissing sound is succeeded by crepitating, sub-crepitating, and mucous râles. This latter continues for a longer or shorter time, then disappears, and nothing is heard but the natural sound of respiration. Bloodletting, both local and general, blisters applied on the chest and the extremities, repeated purgatives, antimonials, such are the means which have appeared to us to afford most relief under such circumstances. In more than one case, in particular, purgatives seemed to us to act more effectually than any other means; but it is on the condition of their producing copious evacuations. Amidst this scene the heart, to which one would be inclined to refer the symptoms, evidently performs either no part at all, or a very secondary one. There are several persons who complain of palpitations; but these do not open the scene; they only manifest themselves when the dyspnœa has attained a high degree of intensity, and when the hissing râle is heard over the entire chest. These palpitations seem to me in such cases to be the mechanical result of the temporary embarrassment of the pulmonary circulation; but it may be very easily conceived, that if this embarrassment is often reproduced, it may ultimately become modified in its texture, and at a later period become really diseased.

There is scarcely any period of life at which we have not observed the affection of which we have been endeavouring to give an idea, and which may not be inappropriately designated by the name of *bronchial asthma*. We are at present attending a child thirteen years of age, who, since the first period of life, has not passed a single year without being several times attacked with fits of this species of asthma. In the intervals there is nothing observed indicative of the morbid state of any organ in him. These fits often returned to him in consequence of exposure to cold, which brought on a slight cough; for two or three days he seemed merely to have a little cold, then an intense dyspnœa set in all at once, with all the phenomena above mentioned. At other times the dyspnœa is not preceded by the appearance of any cold; it supervenes from the very first onset, and is the first phenomenon which appears. Oftentimes warning is given of the return of a fit, because in sleep, during the two or three nights preceding it, the respiration is accompanied with a sifflement, which disappears on awaking; this sifflement is heard at a distance, and for the purpose of perceiving it, it is not at all necessary to apply the ear over the chest.

The disease which approaches in its symptoms nearest to those now mentioned is unquestionably pulmonary emphysema, but in the latter the difficulty of breathing is constant, it only increases at intervals; the extreme sonorousness of the thoracic parietes also, the sensible diminution of the respiratory murmur in the points where this great sonorousness exists, the frequent change of form in the chest in the points corresponding to the emphysema; such are the signs, by means of which we may be able to distinguish the asthma, which depends on this affection from that which recognises for its cause a simple affection of the bronchi. Again, during the fits, whether they are occasioned by the first or second of these morbid states, the sibilous rhonchus is equally heard, either pure or mixed with other dry or moist rhonchi; it must then be admitted that, in pulmonary emphysema itself, one of the causes of the return of the fits of asthma is the tumefaction which momentarily affects the mucous membrane of the bronchi, most frequently after a new cold contracted by the patient.

35. Thickening of the mucous membrane is one of the changes which chronic bronchitis most frequently produces. According to its different degrees, this

thickening gives rise to different symptoms; it modifies the sound occasioned by the entrance of the air into the bronchi; the result is a particular râle, which we shall call bronchial râle (*râle ronflant* of Laennec). The numerous varieties of this râle, and the cause, have been so well pointed out by him, that it would be needless to recur to it here. This râle is also characteristic of chronic bronchitis.

The thickening of the mucous membrane may be sufficiently extensive in one or more tubes to narrow their cavity very much, and even to obliterate it altogether. The result is a number of particular phenomena, which we shall now point out.

Case 2.—Chronic bronchitis—Narrowing of the principal bronchus of the upper lobe of the right lung—Almost entire absence of the respiratory murmur in this lobe.

A toy-man, thirty-one years of age, entered the hospital on the 31st of July, 1822. He then presented the symptoms of an organic disease of the heart, The respiration, when examined, was heard posteriorly very loud and distinct, with a mixture of a mucous râle in several points. Anteriorly, and on the left, it was also heard with an intensity proportioned to the embarrassment of the respiration. On the right, on the contrary, under the clavicle, the inspiratory murmur, distinct as on the left, was much weaker. Percussion could not afford any exact information by reason of the infiltration of the thoracic parietes;* however, the sound was not duller on the right than on the left. We were inclined, in consequence of these signs, to suspect the existence of an emphysema of the upper lobe of the right lung. On the following days auscultation afforded the same information. The patient said he had experienced for a long time back a sort of *squeezing* a little above the right breast. He said that *he did not breathe on the right side of the chest.* Towards the middle of August the signs of a hydrothorax consequent on the lesion of the heart, manifested themselves (dull sound and absence of the inspiratory murmur, particular trembling (*cherrotement*) of the voice in the posterior and left part of the thorax). From this time the dyspnœa went on increasing, and death supervened on the 7th of September.

Post-mortem. The upper lobe of the right lung presented no trace of emphysema; its tissue crepitated but little; healthy in other respects. The principal bronchus of this lobe presented, a few lines from its origin, such a narrowing, that a fine stilette could scarcely pass the obstacle which existed in this point. A little before its division, the bronchus recovered its natural calibre. In the part where the narrowing existed, the fibrous membrane had preserved its ordinary appearance; but the mucous membrane was red and very much thickened. This partial thickening of the bronchial mucous membrane seemed entirely analogous to the circumscribed thickenings so frequently observed in the intestinal mucous membrane. In the remainder of this lobe the bronchi had their natural calibre. Nothing remarkable in the rest of the lungs. Effusion of about a pint and half of lemon-coloured serum into the left pleura. Hypertrophy of the parietes of the two ventricles, with dilatation of their cavities. Narrowing of the aorta. General redness of the digestive tube.

The narrowing observed in one of the bronchi was owing merely to the thickening of the mucous membrane. The place where the narrowing existed accounts very well for the diminution of the respiratory murmur in all the upper part of the thorax. But this phenomenon, the mechanical result of several kinds of

* This is one of the cases where the plessimetre of Dr. Piorry may be employed with much advantage with this instrument: it has happened to me more than once to discover on the two sides of the chest a difference of sonorousness, which my fingers, by striking on the infiltrated parietes, had not ascertained so accurately or distinctly.

lesions, could not be regarded as a pathognomonic sign. We should remark the feeling of constriction, which was so marked in our patient on the side of the chest where the narrowing existed. With respect to the other sensation, which the patient expressed so well when he said that *he did not breathe on the right side of the chest*, it is not peculiar to the affection now in question. We have found the same sensation in other patients, into whose lungs any cause obstructed the free entrance of the air.

The thickening of the bronchial parietes has not always its seat exclusively in the mucous membrane. The cartilaginous and fibrous tissue placed outside this membrane may also undergo greater or less hypertrophy, and powerfully concur in the production of the narrowing. Here is an instance of it.

Case 3.—Chronic bronchitis—Thickening of the parietes of some bronchi with perceptible narrowing of their cavity—Pulmonary tubercles on the opposite side.

A sempstress, twenty-six years of age, entered the La Charité in the September of 1822. At the age of eighteen she had caught cold, the effects of which had not ceased ever since. For the four first years this affection seemed to have no injurious influence on her health. About the age of twenty-two she began to feel a slight dyspnœa, and she had a copious hemoptysis. From this period the cough became frequent and more painful; she lost her flesh and strength, the oppression became greater, and during the two following years the spitting of blood frequently returned. From her twenty-fourth to her twenty-fifth year, nature seemed to make an effort towards a cure, or at least the symptoms above-mentioned made no progress. No hemoptysis took place, and the patient recovered a little strength. But at the end of this time, a very abundant hemoptysis reappeared, and lasted for several weeks; from that time she wasted rapidly. She was admitted several times into different hospitals, but without ever experiencing any relief from the treatment adopted. When we saw her, she was in the last stage of marasmus. Auscultation detected under the left clavicle, and posteriorly on this same side, a well-marked gurgling in the supra-spinous and infra-spinous fossæ, a sure sign that tuberculous excavations existed in these parts. On the right side, in the space between the clavicle and breast, the ordinary respiratory murmur was replaced, in several parts, by a kind of well-marked snoring (*ronflement*). Everywhere else the respiration on this side was distinct and loud. Percussion detected a full sound beneath the left clavicle. The patient said that from the commencement of what she called her *cold*, she had for a long time felt a sort of habitual and very painful heat to the right of the upper portion of the sternum. She died three weeks after her admission.

Post-mortem. Immense caverns in the left lung, with grey hepatisation of the parenchyma around them. No tubercle in the right lung; its tissue seemed healthy. The bronchi of the two lungs were red. Those of the upper lobe of the right lung presented moreover the following peculiarities: the principal bronchus distributed through this lobe, had scarcely divided twice or thrice when its parietes acquired all at once an unusual thickness, and at the same time the diameter of the tube underwent a perceptible diminution. This diminution might be readily appreciated, by comparing the diameter presented by the same bronchi in the two lungs. Those of the left, which appeared to have retained their ordinary dimensions, presented a capacity three or four times as great. Some of the subsequent branches were observed to resume their usual calibre, then occasionally to become thickened and narrowed at the same time. Red patches in the stomach; ulceration in the small intestine.

On viewing this case particularly with respect to the narrowing of the bronchi, we see that this narrowing was more general, but less considerable than in the subject of the second case. Thus the respiratory murmur was not here

diminished ; but there was only heard a particular *rhonchus* in different points of the upper lobe of the right lung. The nature of the alteration explains this modification of the respiratory murmur.

This case, in other points of view, again possesses considerable interest. The sensation of heat which the patient said she experienced under the right clavicle for the last six years, indicated that since that time the inflammation had its seat more especially in the bronchi of the upper lobe of the right lung. However, no tubercle existed in the lung, whilst there was a great number of them in the left, where the bronchitis appeared to have been less severe.

We have observed in some other cases a narrowing of the bronchi nearly analogous to that now described, and attributable, like it, to a simultaneous hypertrophy of the different tunics. Sometimes we have heard, as in this case, different varieties of the dry bronchial râle, in the place where the narrowing existed : sometimes, being less marked, it did not sensibly modify the respiratory murmur ; nor did it give rise to any particular symptom.

36. We shall now record a case in which the narrowing of the bronchi was the mechanical result of their compression by a tumour.

Case 4.—Chronic bronchitis—Compression of the large bronchi of the right lung by a mass of encysted melanosis—Respiratory murmur weaker on the right side.

An old man entered the La Charité in an advanced stage of emaciation ; he had a cough, and expectorated a considerable quantity of puriform sputa. By auscultation we ascertained that the respiratory murmur was very loud on the left, even *puerile*, whilst on the right it was much weaker. On the two sides, moreover, a mixture of the snoring and mucous râle was heard in different parts. The sonorousness was equal on the right and left. He had diarrhœa for a considerable time. He died in a few days after his admission.

Post-mortem. The root of the right lung was occupied by an enormous mass of melanosis, which seemed to have commenced in the bronchial ganglions, of which no trace could be detected. The bronchus arising immediately from the bifurcation of the trachea was included in this mass, and so compressed by it as scarcely to equal one-half the calibre of the principal bronchus of the other lung; general redness of the bronchial mucous membrane ; ulceration in the large intestine.

In this individual, as in the subject of the second case, the narrowing of the bronchi, by preventing so great a quantity of air from entering at once into the lung, diminished the intensity of the respiratory murmur in it, which, on the contrary, was very loud on the opposite side, as if a compensation had been established between the two lungs with regard to the quantity of air received by each in a given time.

In children it is not uncommon to see the bronchi compressed and narrowed at their origin by masses of tuberculous ganglions. The same effects have also been seen to be produced by aneurisms of the aorta.

37. From the preceding cases it appears that no constant symptom announced a narrowing of the bronchi. Different symptoms present themselves in it, according to its seat, its extent, and especially according to its degrees. Thus it often exists without giving rise to any particular phenomenon. The rhonchus which it sometimes produces, the diminished intensity of the respiratory murmur, which, in other cases, is the consequence of it, are no doubt well-marked phenomena, but as resulting equally from a great number of different lesions, they cannot serve to establish the diagnosis of narrowing of the bronchi.

38. The bronchi affected with chronic inflammation sometimes undergo a kind of alteration opposite to the preceding ; they become dilated in a greater or less portion of their extent.

It was only in latter times that dilatation of the bronchi was especially noticed by M. Laennec. His work on auscultation contains some valuable details of pathological anatomy on this subject. But at the time when Laennec published his researches, he possessed as yet but few facts on this subject, and it was only by a sort of *à priori* that he traced the symptoms of dilatation of the bronchi, leaving to those who followed him the easy task of verifying his ideas. Since the writings of Laennec have directed the attention of medical men to dilatation of the bronchi, we have had several opportunities of observing it, and our own researches have fully confirmed the exactness of every thing said by Laennec on the subject. Every time the dilatation of the bronchi was considerable, it was announced to us by resonance of the voice resembling pectoriloquy more or less; in a less degree, signs sufficiently characteristic have equally led us to suspect its existence. In fine, in a still smaller degree, it was not announced by any particular symptom. In the following cases we shall find examples of these different shades.

Case 5.—General chronic bronchitis—Dilatation of a single bronchial branch—Absence of characteristic symptoms of this dilatation—Cancer of the stomach.

A slater, sixty-two years of age, had a cough for the last five or six years, when he entered the hospital in April, 1822. Besides, for the last two years he began to show some symptoms of an organic disease of the stomach. When we saw him he was already in an advanced stage of marasmus, the result of the gastric affection. He coughed frequently, and expectorated yellow thick sputa in great abundance. The chest, when percussed, sounded clearly in every part. When examined with the stethoscope, the respiration was heard on both sides with a mixture of the different bronchial râles. This man sunk under the disease of the stomach three weeks after his admission.

Post-mortem. Pulmonary parenchyma healthy and crepitating, engorged in the posterior part; encysted calcareous concretion of the size of a hazel-nut towards the summit of the right lung. The bronchi of the two lungs presented numerous red patches on their inner surface. They were filled with a great quantity of mucus. In the middle lobe of the right lung we found a bronchus which equalled at least three times the diameter of that which preceded it, whilst in the healthy state it should be less than it. The tubes which arose from this dilated bronchus had their ordinary capacity. Cancer in the pyloric portion of the stomach. This dilatation, thus limited to one single lobe, appeared to exercise no influence, and was not indicated by any particular symptom.

Case 6.—Chronic bronchitis with aneurism of the heart—General dilatation of the bronchi of one lobe—Peculiar resonance of the voice, and the respiration as it were blowing (*soufflante*) in this same lobe.

A porter, sixty-six years of age, entered the La Charite in the beginning of January, 1832. He then presented all the signs of an organic affection of the heart: orthopnœa, puffing of the face, anasarca, pulsations of the heart heard with slight impulsion in the precordial region and at the lower part of the sternum, distinct and loud under the two clavicles (hypertrophy of the ventricles with dilatation of their cavity). On auscultating the chest in the space comprised between the clavicle of the right side, and the breast of the same side, and posteriorly in the supra-spinous fossa, we found that in this extent the voice resounded much more than in any other part of the thorax, but it was rather a peculiar resonance than a real pectoriloquy. In this same extent, every time the patient inspired, one would have said that some one was blowing forcibly at the extremity of the cylinder applied to the chest; in every other part the

sound of the respiration was natural, with a mixture however of mucous râle in several points. The patient soon died in the same way as aneurismatic patients usually die.

Post-mortem. Lungs very much engorged with a colourless serous liquid, violet redness of the bronchi. On comparing the upper pulmonary lobes on the right and left, we ascertained a manifest dilatation in all the bronchi of the upper lobe of the right side; in whatever part the tissue of the lung was cut into, open bronchial orifices were met, nearly as large as the principal bronchus which ramified in this same lobe. The parietes of these tubes, considerably thickened, occasionally presented cartilaginous rings, as manifest and as hard as at the bifurcation of the trachea. In two or three points, the mucous membrane appeared slightly ulcerated. Hypertrophy of the two ventricles with dilatation of their cavities; cartilaginous patches in the aorta. General redness in the gastro-intestinal mucous membrane.

In this patient, the dilatation of the bronchi, more considerable and more superficial than in the preceding case, was announced by two well-marked symptoms, namely, great resonance of the voice, and the peculiar *souffle* of the inspiratory murmur.

Case 8.*—Chronic bronchitis—Dilatation of several bronchi—Pectoriloquy—Ulceration of the stomach.

A periwig-maker, forty-six years of age, with brown skin, black hair, and well-formed chest, had been liable for several years to catch cold very readily. For the last year there was habitual oppression; towards the end of December, 1821, there was hemoptysis for the first time. Dating from the February of 1822, the period at which he contracted a new cold, a copious expectoration set in, the sputa were puriform, and seemed to the patient intolerably fetid. In fine, for the eight days preceding his entering the hospital, he felt on the left side of the chest an acute pain, with which he was attacked for the first time after a severe wetting from rain. He kept his bed only for the last eight days.

When he entered the hospital in the latter end of March, there was orthopnœa; his countenance expressed intense anxiety. He expectorated without any exertion, and after a slight cough, yellowish, thick, nummular sputa, which floated on an abundance of serum. He had an acute pain over all the left side of the chest, which prevented us from employing percussion. The inspiratory murmur, then examined, was loud and clear on the right, much weaker on the left, both anteriorly and posteriorly. The voice resounded very much over all the left side; on this same side, anteriorly on a level with the breast, and posteriorly a little above the inferior angle of the scapula, there was evident pectoriloquy. Pulse not very frequent, the skin hot and dry. The digestive functions did not appear much disturbed.

From the aggregate of these symptoms, the diagnosis did not appear doubtful. M. Lerminier considered the patient to be labouring under pulmonary phthisis, the progress of which was slow. The nature of the sputa, the pectoriloquy, seemed to indicate that cavities were already formed. The acute symptoms which appeared for the last eight days, seemed the result of an inflammation of the left pleura; the almost total absence of the respiratory murmur on the left might be equally considered, either as the result of the pain which opposed the movement of the ribs of this side, or as the product of an effusion. (A blister over the left side of the thorax.)

The beginning of April, the expectoration changed character. It was now a greyish liquid, which flowed in a continued stream, very fetid, and in great

* The 7th Case containing nothing very particular has been omitted.—Tr.

quantity. During the months of April and May, the patient became progressively weak. The pain of side continued; the pain prevented him from lying on the left side, and from the moment he placed himself on the right side, he was smothering. The sputa, still copious, became more and more fetid. Every evening the patient had a shivering, and a burning heat all night; but *he never perspired:* a circumstance which appeared to us remarkable, in a person whom we considered affected with pulmonary tubercles. In the morning, and during the day, the pulse was scarcely frequent. Towards the end of April, the patient began to experience the greatest disgust for every kind of food; the tongue, however, presented its natural appearance. There was neither vomiting, nor pain in the epigastrium. In the beginning of May, diarrhœa supervened; it appeared and disappeared alternately during all this month, and the first fifteen days of June. During his stay in the hospital, the patient took demulcents, Iceland moss, Morton's balsamic pills. The purging was met with the white decoction of Sydenham, decoction of catechu, pills consisting of alum and extract of rhatany. Blisters were applied several times, either over the thoracic parietes, or to the lower extremities. The beginning of June, the patient wasted away rapidly; he fell into a state of continual stupor, from which he could with difficulty be roused. He died the 16th of June.

Post-mortem, eighteen hours after death. Extreme degree of marasmus.

Cranium. — Considerable quantity of slightly turbid serum in the sub-arachnoid cellular tissue of the external surface of the cerebral hemispheres. A very small quantity of transparent colourless liquid in the ventricles.

Thorax. — Some albuminous, membraniform concretions, lined here and there the left pulmonary pleura. It was not adherent to the pleura costalis.

The left lung crepitated in general very little; however, when put into water, it floated. In its upper lobe there was a cavity large enough to admit a middle-sized nut, and filled with liquid similar to the expectoration. A bronchial tube, capable of admitting a writing pen, opened into its interior. Dissection soon convinced us that there was a continuation between the parietes of the bronchus and those of the cavity, and that one and the same tissue formed both: in both we found the mucous membrane red and thickened, and the fibrous membrane, and some traces of the cartilaginous rings. Hence it appeared evident to us, that what we had at first taken for a tuberculous excavation, was nothing but a considerable dilatation of a bronchial branch. In several points of the parietes of the portion so dilated, there were small orifices, which led into other bronchi.

On following other bronchial ramifications, either in the upper lobe, or in the lower lobe of the same side, we saw a considerable number of them suddenly acquire three or four times their natural size, then contract again, in order to enlarge once more. We remarked none of them to terminate in a cul-de-sac; all, on the contrary, in the points dilated, presented on their inner surface several small openings, which were the orifices of so many bronchial tubes of almost capillary size. The pulmonary tissue situated between these bronchi thus dilated, appeared compressed, and resembled the tissue of a lung more or less forcibly pushed back by a pleuritic effusion.

The right lung much more crepitating than the other, likewise presented some of its bronchi dilated, but in a less degree. These dilatations were partial, and consisted in small enlargements full of a puriform liquid, which were, on an average, large enough to admit a hazel-nut. To form these enlargements, branches of small size were dilated here and there, and then resumed their primary dimensions. The pleura costalis and pleura pulmonalis of this side were united by old cellular adhesions. The heart, which was small in size, contained a white, rather dense clot, which adhered strongly to the carneæ columnæ.

Abdomen.— The mucous membrane of the stomach presented, along the great curvature, from five to six superficial ulcerations, the edge and bottom of which were reddish. Bright red injection of the transverse and descending colon.

In this case we find : 1st, a dilatation of a bronchial tube large enough to form a real cavity in the midst of the pulmonary parenchyma which was compressed around it ; 2d, a series of small successive enlargements along the extent of one and the same tube. No particular symptom announced the existence of this second variety of dilatation ; on the contrary, the more considerable dilatation of the bronchi of the left lung was announced, as in the preceding, by a peculiar resonance of the voice. In fine, the great dilatation, which existed in the upper lobe of the left lung, gave rise to genuine pectoriloquy. But whilst in the preceding cases, the entrance of the air into the dilated bronchi was accompanied with a sort of very remarkable puff (*souffle*), here, on the contrary, not only this souffle did not exist, but even the inspiratory murmur was sensibly weaker on the left than on the right. Did this diminution of the respiratory murmur on the side where the dilatation was greatest, depend on the compression which the dilated bronchi must exercise on the pulmonary tissue ? Thence a collapse of the cells and diminution in the quantity of air habitually entering them.

In other respects, all the symptoms seemed to indicate the existence of pulmonary phthisis ; the absence of the perspirations alone, so constant a phenomenon in this disease, might incline us to doubt a little the tuberculous degenerescence of the lungs. It was solely in the bronchial mucous membrane that these nummular, purulent sputa had their origin, which ordinarily announce almost to a certainty the existence of a tuberculous excavation. Their extremely fœtid odour is also worthy of remark. A similar phenomenon is mentioned by Laennec.

The ulcerative inflammation, as Hunter called it, detected in the stomach, was not indicated in this patient either by pain, by vomiting, by thirst, or by redness of the tongue ; there was merely observed a total dislike to food. In such cases how pernicious a tonic treatment must prove ! It might, for a little time, arouse the appetite ; but a fatal excess of excitement would have followed. Shall we conclude from this fact, that total anorexia indefinitely prolonged, may suffice in all cases to announce latent inflammation of the stomach ? Certainly not ; for in persons who had for a long time lost their appetite, and particularly in phthisical patients, we have found the stomach totally exempt from inflammation. I have no doubt, but that in the last case, bitter tonics, prudently administered, such as rhubarb, calumba, cinchona, &c., might be as useful, as they would have been pernicious in the present case.

Case 9.—Partial chronic bronchitis—Dilatation of some bronchial branches—Mucous râle in the corresponding points—Cancer of the liver.

A man about fifty years of age died of a cancerous affection of the liver. He had been for a long time annoyed by an obstinate cough, with very copious purulent expectoration. We had frequently auscultated the chest, and every time detected a well-marked mucous râle on the left side of the chest ; both posteriorly on the level of the infra-spinous fossa, and anteriorly on the level of and within the breast. The resonance of the voice in these different points was not increased ; percussion yielded a clear sound. This man had none of the signs of tuberculous degenerescence of the lungs, and the râle in several points of the left lung appeared to us to depend solely on the accumulation of mucus in the bronchi. The autopsy verified this part of our diagnosis. Most of the bronchi of the lower lobe of the left lung, were red in their internal surface, and filled with puriform mucus. But, still further, some branches presented here and there small dilatations, for the most part fusiform, with extremely thin parietes, and

collapsing as soon as either by incision, or by slight pressure they were emptied of the mucus which filled them. The bronchi of the upper lobe of this lung, and of the entire right lung, were pale and empty.

Auscultation announced, in this case, with great precision the seat and extent of the bronchitis; but it furnished no sign which could have induced us to suspect the existence of dilatations of the bronchi.

39. From the preceding cases, as well as from those recorded in Laennec's work, we may, I think, enumerate three principal varieties of dilatation of the bronchi, as well with respect to the nature of the lesion, as with regard to the symptoms indicating it.

In a first variety, one or more bronchi present through their entire extent a greater or less increase of capacity. Sometimes then the tubes resulting from the fourth, fifth, or sixth division of the principal bronchus of each lung, have a diameter equal to, or even greater than the diameter of the latter. Sometimes this dilatation affects but a single branch; sometimes it exists in several, it sometimes even extends to the bronchial branches of an entire lobe. This kind of dilatation cannot be considered in all cases as the result of mere passive distension of the bronchial parietes. Oftentimes, in fact, these parietes present a thickness evidently greater than in their physiological state; the mucous membrane possesses greater consistence, and greater density than usual, being sometimes ulcerated; the fibrous membrane, usually so thin in the small bronchi, is hard and resisting, and the cartilaginous tissue which, in the healthy state, does not exist there, or does not manifest itself there, but in the form of isolated grains, is much more apparent. This first kind of dilatation of the bronchi is not there, at least in all cases, the merely mechanical result of the efforts to cough, or of the accumulation of mucus; it is a sort of hypertrophy of the tissue of the bronchial parietes.

This first variety of dilatation of the bronchi, from its being so inconsiderable and of such small extent, cannot be recognised during life without difficulty: when carried to a higher degree, it is indicated by symptoms sufficiently characteristic. Thus in one of the cases which we have mentioned, where most of the bronchi of the upper lobe of the right lung were considerably dilated, the voice resounded in such a manner, both beneath the clavicle and in the supraspinous fossa, that we might have believed in the existence of a tuberculous excavation. Oftentimes there is heard at the same time, when the dilatation exists, sometimes a well-marked mucous râle, a genuine gurgling similar to the gurgling of full caverns; sometimes this gurgling is succeeded by a sort of well-marked puff (*souffle*), such as is sometimes heard in empty tuberculous cavities.

In a second variety there is no longer observed the uniform dilatation of one or more bronchi through their entire extent; but one of these tubes presents, in merely one point of its extent, an enlargement more or less considerable; the result of this is a real accidental cavity, which presses back around it the pulmonary parenchyma. Thus one of our cases showed us in one of the pulmonary lobes a cavity large enough to contain a nut: its internal surface presented a considerable number of orifices, which led, each of them, into a bronchus of an almost capillary diameter. One might easily recognise, in the parietes of this cavity, the texture of the bronchial parietes, either the mucous membrane which was continued from the small tubes into its interior, or the fibrous membrane which, through the entire extent of the dilatation, was much more apparent and more dense than in the bronchial branches adjoining. It seemed that here again the cavity of the bronchus became enlarged, according as its parietes became thickened, as is observed in certain dilatations of the aorta coinciding with hypertrophy of its membranes. We have above seen that at other times, on the contrary, the thickening of the parietes of the bronchus coexists with narrowing of its cavity.

The diagnosis of this second variety must be more or less easy, according to the situation and size of the dilatation. It may be announced either by genuine pectoriloquy, or by a characteristic souffle, which is heard every time the air enters the lungs.

In fine, in a third variety, one and the same bronchial tube being dilated at intervals, presents along its course a succession of dilatations and narrowings. On cutting into the pulmonary parenchyma we find it traversed as it were by a great quantity of small rounded tumours, remarkable for their white colour, for which they are indebted to the puriform liquid which fills them. On penetrating into them with the point of the scalpel, one may easily satisfy himself that these tumours are continuous with small bronchi, which, in order to form them, become enlarged in different places. In the cases of this kind seen by us, the bronchi have not appeared to have increased in thickness in the places dilated, as in the two first varieties; their parietes were, on the contrary, very thin. One might then be inclined to admit that, in this latter variety, the small partial dilatations of the bronchi are but the mechanical result of their distention by mucus in the points where their parietes present least resistance, either by a diminution of their elasticity, or by their really becoming thinner. This sort of dilatation seems to be less rare in children than in adults. I have frequently ascertained its existence, together with M. Guersent, in the hospital for sick children.

It is obvious that it is nearly impossible to establish the diagnosis of this third variety. At most one can only suspect it from the long standing of the bronchitis, the characters of the cough, the great quantity and nature of the sputa, the different râles which are heard, &c.

CHAPTER II.

ALTERATIONS IN THE SECRETION OF THE BRONCHIAL MUCOUS MEMBRANE.

40. The mucous membrane of the air passages cannot be inflamed without the liquid which it secretes presenting modifications, some of which regard its quantity, others its qualities. The greater or less obstruction of the bronchi by this liquid necessarily modifies the respiratory murmur which exists in the healthy state. Instead of hearing the distinct murmur of the pulmonary expansion, we hear a râle which is obviously owing to the displacement of the liquid by the column of air which enters the bronchi at each inspiration. We designate this murmur by the generic term of moist bronchial râle (mucous râle of Laennec). It is far from being as characteristic as the dry bronchial râle of which we have already spoken; sometimes it is confounded by insensible shades with the râle of pneumonia, of which we shall speak elsewhere; sometimes having its seat particularly in the largest bronchi, it approximates more or less closely to the gurgling which indicates the presence of a tuberculous excavation. In this case, the seat of the râle, its extent, the consideration of the other symptoms, may assist the diagnosis with more certainty than the nature of the murmur heard. The following case will justify what we have now stated.

Case 10.—Chronic bronchitis—Moist bronchial râle (mucous and crepitous râle blended) over the entire extent of the two lungs.

A labourer, forty-eight years of age, of strong constitution, had enjoyed good health up to the year 1821; he then contracted a cold, the effects of which lasted up to 1824. However, he did not give up his usual employment: the day even

before he entered the hospital, he worked as usual; he was then seized with an acute pleuritic pain in the right side with fever and dyspnœa. Having entered the La Charité, he was immediately bled, and the painful side was covered with leeches. The day after the pain diminished the breathing was more free, but the pulse retained some frequency without there being, however, any heat of skin; the fits of coughing were frequent and painful; the expectoration consisted of a greenish, thick mucus, divided into rounded patches, which floated in a great quantity of serum. The chest, when percussed, sounded well in every part. Auscultation detected in every part of the chest a very manifest râle; in a great number of places, we heard as it were large bubbles of air bursting on the surface of a liquid; in other respects the sound resembled the tracheal râle of dying persons; in other points of the chest, the bubbles of air appearing smaller and more numerous, seemed to produce, every time they burst, a noise which might be aptly enough compared to the crepitation of a salt thrown on an ignited body. The pulsations of the heart were heard, accompanied with a sound, but without impulsion, in the lower part of the sternum. The breathing was short and hurried. For a long time the digestive functions of the stomach had not been duly performed. The patient had very little appetite, and frequent pains in the epigastrium; he vomited his food from time to time. The appearance of the tongue, however, was natural. Marasmus was observed to be already commencing.

M. Lerminier gave the following diagnosis: *chronic bronchitis complicated with acute pleuritis, dilatation of the right cavities of the heart, without hypertrophy of their parietes, chronic gastritis.*

A blister was applied over the side affected with pleuritis.

On the following days the stitch in the side disappeared, the frequency of the pulse lessened, but the symptoms of bronchitis continued. From the 15th of May to the 20th of June the signs of the disease of the heart became more marked, the oppression constantly became greater; the countenance assumed a violet tint; the lower extremities first became infiltrated, then the integuments of the abdomen and chest. We still continued to hear the different varietes of râles already mentioned. The patient died on the 21st of June, in a state of extreme dyspnœa. Up to his death he took nothing but mere emollient drinks. The active diuretics which we attempted to give him increased the pain of the epigastrium, and were rejected by vomiting. Leeches were several times applied to the anus, and blisters kept to the lower extremities.

Post-mortem. Lungs engorged with a great quantity of bloody serum; they were sound in other respects, and crepitated. Inner surface of the bronchi very red in all their ramifications. Considerable dilatation of the right ventricle of the heart, without any other lesion of this organ, or of the great vessels. An effusion of half a glass full of pus into the left pleura, circumscribed by false membranes, near the base of the lung. White softening of the mucous membrane of the stomach over the principal portion of the great cul-de-sac. This softening was such, that the membrane, when very slightly scraped with the back of a scalpel, was raised in a liquid form.

This case presents an example of the different shades of moist râle which may be produced by mere inflammation of the bronchi. In several places this râle approximated very closely to the crepitating râle of pneumonia; in other parts it scarcely differed from the gurgling of cavities. But, on the one hand, the great extent of this râle, and on the other hand, the absence of the signs indicative either of pneumonia or of tubercles, inclined us to think that it was merely the result of the bronchi being filled with mucus. The varieties of this purely bronchial râle depended, no doubt, both on the difference of the calibre of the bronchi in which the phenomenon occurred, and on the difference in the

quantity and quality of the liquid which obstructed these tubes, their calibre being supposed the same.

In this case the disease of the heart appears to have been consecutive to the affection of the bronchi, the habitual engorgement of which might be considered as a permanent obstacle to the free afflux of blood to the lung. Very few symptoms as yet announced aneurism of the heart when the patient entered the hospital. Auscultation alone detected its existence. The double inflammation of the bronchi and stomach alone was evident, and was the sole cause of the symptoms. But the scene soon changed: the entire group of symptoms which characterise dilatation of the right cavities of the heart was seen to appear. The affection of this organ became from that time the prevailing disease, and it was of it the patient died.

41. It sometimes happens that, during the course of a bronchitis, we all at once cease to hear in a certain extent of the lung either the natural sound of the pulmonary expansion, or the bronchial râle. In this same part where the ear no longer hears any murmur, whether natural or healthy, the chest when percussed retains its usual sonorousness. At the same time the patients are seized with greater or less dyspnœa. With Laennec we attribute this sudden suspension of the respiratory murmur to the momentary obstruction of a bronchus, the ramifications of which are distributed to the portion of the lung where the respiration has ceased to be heard. In this case, after a violent fit of coughing, the effect of which is to expel, or at least to displace, the more or less tenacious mucus which obstructed the bronchus, the respiratory murmur becomes re-established as promptly as it had disappeared, and the dyspnœa ceases. However, in some rarer cases, the murmur of the pulmonary expansion is not re-established, the difficulty of breathing increases, suffocation becomes imminent, and death by asphyxia soon takes place. The slightest bronchitis may in that way be changed all at once into a very severe and rapidly fatal disease. The two following cases will present us with facts of this kind.

Case 11.—Chronic bronchitis—Obstruction of a bronchus by mucus—Death by asphyxia.

A labourer, fifty-three years of age, entered the La Charité in consequence of articular rheumatism; he had also, for about the last two months, an obstinate cough, with expectoration of thick, tenacious sputa. The chest, being percussed several times, always yielded a clear sound. The respiration was heard very distinct on all the left side, and with a mixture of mucous râle in the upper and middle lobes of the right lung. There was no dyspnœa. He had been already several times bled in consequence of the articular inflammation, when one day, in the midst of a violent fit of coughing, the patient was seized all at once with extreme difficulty of breathing. The remainder of the day, and all the night, there was orthopnœa, and almost continual efforts at coughing. The following morning there was imminent asphyxia, face swollen and violet, extremities livid, pulse nearly extinct. The patient, with difficulty pronouncing some words with panting, entreated that we would relieve him from an enormous weight, which he said he felt on a level with the right breast, and which was smothering him. The sonorousness of the chest was not diminished. The respiratory murmur was *puerile* over all the left side; on the right, posteriorly, some mucous râle was heard in several points; but on this same side, anteriorly, from the clavicle to a little below the breast, and behind in the supra-spinous fossa, neither the respiration nor the râle was heard, though the chest was elevated with force; we supposed there was *pulmonary emphysema*. We had hardly quitted his bed when he expired.

Post-mortem. The viscera of the cranium and abdomen presented nothing remarkable, except general venous injection. The heart, which was well pro-

portioned, contained in its right cavities black blood half coagulated. The lungs, engorged as in several dead bodies, presented, however, a tissue which floated in water. Nothing remarkable in the larynx and trachea. We were in total ignorance of the cause of the symptoms, and of death in particular; nothing explained to us the absence of the respiratory murmur recognised during life in the upper part of the right lung, which absence we had referred to emphysema. But on cutting into the bronchi the blunt point of our scissors met, at the origin of a large air-tube, a mass of concrete half solid mucus, which closed like a stopple this membranous tube, and extended into its interior. It was from this bronchus thus obliterated that the branches arose which carried the air into the upper lobe of the lung. The bronchial mucous membrane was also very red.

One might be astonished that, in this person, symptoms so severe should have resulted from the interception of the entrance of air into a very small portion of the lungs, whilst in a great number of patients, the entire almost of whose lungs was become impermeable to air, life is sustained for a long time, and often without there being much dyspnœa; but in them the permeability of the lungs ceased only by degrees, whilst in our patient the interruption of air was sudden.

We should here remark, that if, in this case, the inspection of the bronchi had not been carefully made, the disease might have been taken for a nervous asthma, for want of any appreciable lesion; and this dyspnœa, which depended on a cause altogether mechanical, might even have been considered as a striking example of metastasis of rheumatism to the lungs.

Case 12.—Chronic bronchitis with melanoses—Obstruction of a bronchus by a mucous concretion resembling a polypus, increasing dyspnœa, and death.

A coachman, fifty years of age, entered the hospital several times in order to be treated for an inveterate pulmonary catarrh, with slight dyspnœa, and copious purulent expectoration. Each time he went out relieved, but not cured. We detected in this person, on both sides of the thorax, all the varieties of the bronchial râle. In one point, the column of air, in penetrating into the bronchi, resembled the snoring of a person sound asleep; in another point, it was like a dull prolonged groan; in some places, the bellows blast (*bruit de soufflet*): in other parts the cooing of a dove perfectly imitated, &c.; in some places, in a word, a sort of gurgling similar to the tracheal râle of dying persons. The last time the patient came to the hospital, his breathing was still free enough. One morning we found him in a state of unusual anxiety; since the middle of the night, after a violent fit of coughing, his breathing, he said, had become suddenly very much embarrassed. On examining the chest with the stethoscope, we ascertained that the air scarcely entered any portion of the upper lobe of the right lung. There, in fact, the respiratory murmur did not exist, and there was heard only a distant bronchial râle. However, in this same part the chest continued to sound well. The sonorousness was even greater than below the left clavicle, where the sound was become a little dull since the last few months. A blister was applied to the chest. The suffocation increased during the day, and the patient died the following night.

Post-mortem. Melanoses in the form of black hard masses in the summit of the left lung; pulmonary parenchyma sound elsewhere. On the left, bronchi of a livid red and filled with puriform mucus. On the right, precisely at the same place as in the patient of Case 11, the principal bronchus which distributes the air to the upper lobe, was found completely obstructed by a tenacious mucus. This mucous concretion extended, like polypous and vascular concretions, into three or four bronchial branches. The heart and large vessels presented nothing remarkable, neither did the larynx nor trachea.

The reflections made on the preceding case are equally applicable here.

42. Once the attention is awakened to the species of affection now alluded to, its diagnosis does not appear difficult. We should be inclined to suspect the obstruction of a bronchus, if a considerable dyspnœa supervenes suddenly in the midst of a simple bronchitis, and if, at the same time, the respiration ceases to be heard in a certain portion of the lung, percussion continuing to give a clear sound in the same part. Pulmonary emphysema is the only disease which can give rise to this group of signs.

The indication to be fulfilled in this case is evident, to expel the mucous concretion which obstructs the bronchi; the shocks occasioned by vomiting might be very serviceable; we might also make the patient inhale the vapour of plain water, or water impregnated with different species of aromatics. We might attempt also to administer such medicines as kermes, oxymel of squill, etc., to which has been attributed the power of rendering the bronchial mucus more liquid, by increasing the pulmonary exhalation. We must not neglect also, at the same time, as palliative means, sanguineous depletions and revulsives.

43. In order duly to appreciate the changes which the mucus of the bronchi undergoes when attacked with inflammation, regard must be had to the species of secretion which takes place at their surface, in the state of health, in the different individuals. The pulmonary mucous membrane, considered in this respect, presents as many varieties as the membrane of the nasal fossæ. Many persons, in fact, without having a cold, expectorate at different periods of the day, and principally in the morning, a greater or less quantity of matter, sometimes thin and transparent as the sputa of bronchitis at its commencement, sometimes thick, gluey, and opaque as the sputa of chronic bronchitis.

When a bronchial inflammation attacks an individual not in the habit of expectorating, the cough is at first dry, and continues a long time in this state. Those who naturally have the chest plump and fat, according to the common expression, cease to expectorate if the inflammation be acute, if it be slight the expectoration continues to go on; the quantity of the sputa is even augmented, but their ordinary qualities are changed.

44. The expectoration traced in the different phases of acute bronchitis ordinarily presents itself with the following modifications: —

At the commencement of the disease the cough is dry, except in the case already noticed. As long as this dry cough continues, the bronchitis must be considered as still in its commencement. After a certain period, the length of which varies according to individual peculiarities, and according as the patients are or are not subjected to proper treatment, each fit of coughing is followed by the expectoration of a clear, transparent, glairy mucus, like white of egg; when it is poured from one vessel into another, it is observed to flow in one mass of extreme tenacity. Sometimes it assumes a ropy appearance; it sometimes extends in a sort of transparent filamentous tissue, the appearance of which presents sufficient resemblance to that of the very fine mucous membrane which lines the frontal or maxillary sinuses; its tenacity and viscidity are greater according as the irritation of the mucous membrane is more considerable. When the patient is annoyed with violent fits of coughing, accompanied with considerable heat within the chest, as also with marked distress and very great general anxiety, the expectorated matter acquires remarkable viscidity. Then if we incline the vessel containing it, we see it is not so easily detached from it: it adheres to the edges of the vessels by long streaks, and it resembles a little the jelly-like sputa of acute pneumonia.

45. When the bronchial inflammation is accompanied with fever, the viscidity of the sputa becomes also greater during the febrile paroxysms; and as at the same time the other symptoms of the bronchitis become worse, an experienced practitioner might be deceived by this considerable viscidity of the sputa, and

incorrectly consider it as the sign of an inflammation of the parenchyma of the lung. But if he again observe the sputa, after the cessation of the paroxysm, he will find that they have lost their viscidity, and the mistake will no longer be possible.

At other times every species of expectoration is suppressed during the paroxysm ; which indicates an increase of irritation in the mucous membrane.

Some patients present, towards the end of the perspiration which terminates the paroxysm, a copious expectoration of thick, opaque sputa, such as is observed in the last period of acute bronchitis. But this is only a temporary state, and the patient soon expectorates anew a clear limpid mucus, as before the febrile exacerbation. Thus we see the expectoration present itself in a single and often a very short paroxysm, with all the modifications observed in the different stages of bronchitis.

46. A froth more or less copious ordinarily exists on the surface of the sputa. Their quantity depends on the facility with which they are discharged. If the patient expectorates only after a prolonged fit, during which, the air several times inspired and expired, is intimately mixed with the mucus which fills the air tubes, the sputa he expectorates are blended with a considerable quantity of air, which forms on their surface a sort of mass, which cannot be separated without difficulty.

47. The sputa, in this first stage, are frequently marked with some streaks of blood arising from small vessels which are ruptured in the midst of an effort to cough. The blood is then mixed with mucus, but it is not combined with it as happens in the reddened sputa of pneumonia.

48. It often happens that in the midst of the transparent mucus there are found, in greater or less numbers, small clots of a dull white ; they do not come from the lung, and appear secreted in the pharynx and posterior part of the mouth, by the numerous cryptæ with which the mucous membrane of these parts is supplied. These clots have been erroneously considered as portions of pulmonary tubercles, and consequently as one of the pathognomonic signs of phthisis.

49. As long as the sputa present the appearance which we have noticed, the symptoms of bronchial irritation do not improve; the expectorated matter is still in a state of crudity, according to the ancient mode of expression, — an expression connected with their humoral theories. But according as the inflammation proceeds towards resolution, the sputa change character. The mucus which forms them gradually loses its transparence ; it is mixed with opaque, yellow, white, or greenish masses, which, scanty at first, continually increase, and ultimately constitute the entire of the sputa. Such an expectoration is ordinarily accompanied by a marked remission in the different symptoms of bronchial inflammation. It indicates that this inflammation is resolved, that its coction is effected, as the ancients used to say. Nothing is more variable than the appearance and qualities of the opaque sputa expectorated towards the termination of acute bronchitis.

Though, since the time of Hippocrates down to the present day, it has been asserted, that the resolution of pulmonary catarrh cannot be regarded as complete, until the sputa had acquired a certain degree of thickness and opacity, we have seen some persons affected with intense inflammation of the bronchi become perfectly restored to health, though their sputa had constantly continued in what was called the state of crudity. These, however, are rare exceptions to a general rule.

50. The inspection of the sputa may then serve to indicate with certainty, with some few exceptions, the period of the disease and the degree of irritation of the bronchial mucous membrane. In the case where there is a return of the inflammation, when it was now approaching its termination, the change which

then takes place in the sputa is still a certain index of the return of the inflammation to a more acute state.

Neither is the consideration of the sputa in bronchitis devoid of importance with respect to the curative indications. It is often by having regard to the qualities of the sputa, to their state of transparence and opacity, to their easy, or laborious, rare or frequent, expectoration, that we shall be led to prefer such or such a therapeutic means.

51. When the acute bronchitis, instead of terminating by resolution, passes to the chronic state, the sputa retain the appearance which they presented in the last period of the acute inflammation. They are opaque, white, yellow, or greenish. Sometimes they adhere to the bottom of the vessel, sometimes they float on a transparent or turbid mucus, or else they remain suspended in the midst of it. Most commonly they are inodorous and appear insipid to the patient. Their expulsion, which in general is easy, is preceded by slight efforts at coughing.

The distinction of the sputa of chronic bronchitis from those which belong to tuberculous degenerescence of the lungs is often very difficult. We shall reserve whatever we have to say on this subject for our description of the expectoration peculiar to this last disease.

52. A bronchitis may continue a very long time with an expectoration similar to that which is observed at the commencement of the affection. It is then an acute inflammation, indefinitely prolonged, as is announced not only by the characters of the sputa, but also by the aggregate of the other symptoms, such as an habitual feeling of heat and of dragging within the chest, violent and painful fits of coughing, increased temperature of the skin, &c. Thence the necessity of a demulcent antiphlogistic treatment, notwithstanding the long duration of the disease.

53. The sputa of chronic bronchitis, we have said, are, in general, almost inodorous ; sometimes, however, they have presented a remarkable fœtid odour, nearly equal to that of the greyish sputa of gangrene of the lung. No particular lesion of the bronchi accounted for this unusual fœtor, which could be referred only to a peculiar alteration of the secretion. We have already observed fœtid sputa in one of the patients affected with dilatation of the bronchi (Case 8). Here is another striking instance of it.

Case 13.—Chronic bronchitis—Great fœtor of the sputa—Melanosis of the lung.

A cook, sixty-five years of age, entered the La Charité towards the middle of March, 1822, in a state of extreme emaciation. For the last ten or twelve years his breathing was short, and he had a cough every winter. During the summer of 1821, he spat a little blood. At the time of entering the hospital, he coughed very much, and expectorated a great quantity of *very fœtid* greenish sputa, which flowed out all in one sheet when the vessel was inclined ; one would have said the liquid came from a pleuritic sac or a vast tuberculous excavation. According to the patient's account, a similar expectoration took place for several years back. The chest, when percussed, sounded well everywhere. By auscultation the respiration was heard to be loud and distinct with some whistling (*sifflement*) posteriorly at intervals. The patient was free from fever, and had never had any sweats. (Morton's pills ; compound hydromel.*)

The ten or twelve following days the state of the patient remained the same. The expectoration always presented a repulsive fœtor. Appetite good; great debility.

The 28th of March, the state of the patient became suddenly worse. Face

* See the *Formulaire des Hopitaux de Paris*, by M. Ratier.

livid; extreme dyspnœa; the pulse, which was very frequent and irregular, could scarcely be felt.

The two days following he was threatened with suffocation. A well-marked crepitating râle posteriorly on the two sides; pulse imperceptible; tongue dry and a little brown. He died on the 31st.

Post-mortem. Remarkable softness of the cerebral substance. Considerable quantity of serum accumulated in the lateral ventricles and in the subarachnoid cellular tissue on the upper surface of the brain.

A very great quantity of frothy colourless serum gushed forth from the tissue of both lungs (œdema). In some parts it did not crepitate, was hard, and of a deep black (infiltrated melanosis). The large bronchi, full of a liquid similar to that expectorated with respect to its extreme fœtor, were white on their inner surface, but in the small ramifications filled with the same liquid; the mucous membrane presented a deep red colour.

Red injection of the mucous membrane. Spleen large, very soft, and containing a fluid black as ink.

The great fœtor of the sputa may then sometimes appertain to a mere secretion of the bronchial mucous membrane. Their extreme liquid state, their flowing in one uniform sheet, do not always indicate the existence of a cavity in the pleura or lungs, the parietes of which secrete pus. Besides, this expectoration was going on for several years, and, if it had its source any where else than in the bronchi, death would have occurred much sooner.

The slight melanosis observed in some parts of the pulmonary parenchyma had probably but little share in the wasting of the patient. The marasmus appeared to be caused particularly by the chronic bronchitis, which lasted for a great number of years. Let us not forget to remark, as negative signs calculated to distinguish similar cases from the real pulmonary phthisis, the constant state of apyrexia and the total absence of sweats.

This patient was, no doubt, inevitably doomed to death; he died, however, unexpectedly. In many chronic affections, the patients sometimes die all at once, without a struggle, whilst they still have considerable strength, and when the brain, heart, and lungs still duly perform their functions. The immediate cause of life's ceasing thus suddenly escapes us then altogether. Such was not the case here. Death was preceded by a dyspnœa which came on suddenly, and which seemed to be the result of serous engorgement (pulmonary œdema), which took place all at once in the lungs.

54. There are a certain number of cases of acute or chronic bronchitis which are particularly remarkable for the extreme copiousness of the bronchial secretion. This excessive secretion seems to be, in many cases, the principal cause of the exhaustion and death of the patients. These mucous, serous, or purulent fluxes, are then, in the language of the Montpellier School, the principal element of the disease. The other symptoms of inflammation are often scarcely apparent, or even none at all, so much so that one would be inclined, in some cases, to separate these fluxes altogether from real inflammatory affections, with respect to the nature of the symptoms and of the treatment.

Case 14.—Chronic bronchitis—Abundant expectoration—Death by marasmus.

An old man was brought to the La Charité in the April of 1820. He had a cough for the last eight months, and expectorated for the last five months, in the space of twenty-four hours, better than a pint of transparent, colourless mucus, on the surface of which there were round greenish patches separated from each other. The breathing was short and frequent. The chest, when percussed, sounded well in every part; in every part also the respiratory murmur was

heard with a mixture of the different bronchial râles dry and moist. Skin not hot, pulse not frequent. Extreme emaciation and debility. On the three following days his voice became extinct, features altered, and obstinate constipation set in. On the fourth day there was a slight delirium; diminution in the quantity of the sputa, which are now in the form of patches and of a dirty grey. On the fifth day the patient ceased to expectorate; features sharpened, tracheal râle; he died in the course of the day.

Post-mortem. The tissue of the lungs, moderately engorged with serum, crepitated in every part, and was healthy. The bronchial mucous membrane was red only in patches in the large tubes; in the small tubes the redness was brighter and uniform; they were filled with a liquid similar to that of the sputa. All the other viscera were healthy.

This case furnishes a well-marked instance of a chronic bronchitis exempt from all complication. Did it occasion death by the great wasting attending it every day? As in the thirteenth case, there was no species of febrile reaction. In this case, should not the principal indication have been to endeavour to diminish the excessive secretion of the bronchi by changing their mode of exhalation? Might not this indication have been fulfilled by those substances called balsamic, either given internally or directed to the mucous membrane of the bronchi in the form of vapour? Is it not in cases of this kind that the vapour of tar has succeeded, which was proposed a long time ago as a specific against pulmonary phthisis?

In this patient, the sputa very closely resembled those observed where the lungs are the seat of tuberculous excavations; but *complete absence of fever, and the signs afforded by auscultation*, were capable of throwing light on the real nature of the disease.

Let us remark the great dyspnœa with which this patient was affected, without lesion of either the pulmonary parenchyma or of the heart. The very abundant secretion alone of the mucous membrane of the air passages, must, in fact, be considered as one of the very numerous causes of *asthma*. The persons in whom this depraved bronchial secretion exists, habitually have the breathing a little embarrassed. If under the influence of any cause whatever, they cease to be able to expectorate so freely, or else, if the copious secretion, which habitually takes place on the internal surface of the bronchi, undergoes all at once considerable increase, suffocation may become imminent; but, as soon as the air-passages are disengaged from the liquid which obstructed them by the resources of art or the unaided strength of nature, the dyspnœa diminishes rapidly, and the patient recovers life with free breathing. We shall return to this subject again.

Case 15.—Chronic bronchitis—Abundant expectoration—Lesion of the pulmonary parenchyma.

A man, forty-eight years of age, with black hair, and great muscular development, was annoyed, for the last eight years, by an obstinate cough, from the commencement of which he expectorated a great quantity every day. The sputa consisted of a transparent mucus, on the surface of which large purulent patches floated, with thin, round edges, greenish white colour, inodorous, and separated from each other. The patient had habitual dyspnœa. On auscultating the chest, we found the breathing loud and free, all over the left side of the thorax; but on the right and posteriorly we heard a manifest râle, which appeared to us produced by the mixture of air and mucus in the branches of the bronchi. The patient never had any fever; though very thin, he was not in that state of emaciation which accompanies organic degenerescence of the lung; his strength, of the progressive diminution of which he complained very

much, was still sufficient to enable him to get up every day. In vain had the patient been tormented every day, both before and since his coming to the hospital, by several medicines, external and internal, such as setons, moxas, blisters, sulphureous waters, &c., they neither diminished the expectoration, nor changed its character. Towards the middle of January, 1821, six months after his entering the La Charité, the patient ceased to leave his bed. From that time the debility made rapid progress. Semi-orthopnœa, *never had either fever, diarrhœa, or sweats;* expectoration the same. Only two days before death, his pulse became accelerated, and the skin became hot: the patient vomited a considerable quantity of greenish bile, ceased to expectorate, and died. Was that patient affected with pulmonary tubercles? we never thought so, and the *post-mortem* examination justified our diagnosis.

Post-mortem. The parenchyma of the left lung was perfectly sound in all the lower lobe and in the principal part of the upper lobe; at the summit it was hard, unequal, and black externally; when cut into it presented three or four small masses, black as ink, very hard, each being the size of a hazel nut; others, which were softer, were like bits of charcoal scattered through the tissue of the lung, the vessels of which were injected with this substance diluted in water. This portion of lung was evidently melanosed. The bronchi were pale and empty.

The right lung adhered firmly to the ribs. In some places its tissue traversed by black spots, was hard, greyish, impervious to the air; it was the grey hepatisation of chronic pneumonia, with the admixture of five or six small miliary tubercles, about the size of a pin's head. These diseased portions formed at the utmost three-tenths of the entire mass of the right lung. Elsewhere it was pervious to the air, and perfectly sound; but on cutting into its tissue we observed a puriform liquid, similar to the matter of expectoration, issue from a crowd of small bronchial ramifications. The great tubes which seemed to us more capacious than ordinary, the branch which results immediately from the bifurcation of the trachea, were also filled with it. The mucous membrane was moderately red.

The melanosis* which were found in the summit of the left lung, the very few miliary tubercles developed amidst the portions of the right lung, which were affected with chronic pneumonia; in a word, this chronic pneumonia itself appeared to us to have contributed but in a very secondary way to the wasting and death of the patient. In him, as in the individual, the subject of Case 14, the very copious secretion of the bronchial mucous membrane appears to have been the principal cause of it. With respect to its mischievous effects on the system, this secretion may be assimilated to all excessive evacuations a long time kept up. Let us not forget, however, that some persons bear an abundant loss of bronchial mucus for a very long time, without their constitution appearing to be sensibly injured by it. Such was the case of a man upwards of seventy years of age, of whom Van Swieten speaks, who regularly expectorated every day for thirty years several ounces of pus (*puris albi cocti*), and who, in other respects, was in perfectly good health. Experience too has taught practitioners, that several of these copious expectorations, which produce no disturbance in the system, should be valued; they are a sort of evacuation set up by nature, which are not always stopped with impunity. Is it not, in this respect, the same with the expectoration as with the pus formed by old ulcers, arresting the flow of which is often dangerous?

* I have elsewhere discussed the nature of this lesion, which I think should not be considered as an accidental tissue in the sense attached to this word by Laennec, and which in the lung in particular seems to be nothing but the pulmonary parenchyma indurated and coloured black. See my work on *Pathological Anatomy.*

55. Here we found the mucous membrane less inflamed than in the subject of the 14th Case. In these two patients, however, the expectoration was almost equally abundant, and had the same characters. The following case will afford us an instance of a very copious bronchial flux, without any appreciable trace of inflammation of the mucous membrane.

Case 16. — A cabinet-maker, forty-five years of age, had enjoyed tolerably good health up to about the age of forty-three. He then caught cold, which lasted for six months, and fatigued him very much. Some months after he began to cough again; but this time the cough was in some measure only secondary, and brought on by a sensation of fulness which the patient said he experienced within the chest. This sensation returned several times in the day; it was accompanied with dyspnœa, general uneasiness, sometimes very great distress. A slight coughing hardly commenced when the patient began to expectorate in great quantity a frothy liquid, similar, with respect to colour and consistence, to a weak solution of gum in water. The patient estimated the quantity of expectoration in the 24 hours at about a pint and half. Six months passed on in this state, without the health appearing in other respects perceptibly injured. But at the end of this time the patient began to waste and to lose his appetite and strength. Having entered the La Charité, in the July of 1821, he was now in a state of great emaciation. His face was pale and puffed, some œdema around the ankles; in the midst of the frequent efforts to cough he expectorated a great quantity of a liquid very like gum-water, as has been already mentioned, with a mixture of some mucous flocculi. This liquid, when treated with sulphuric acid, subjected to the action of heat, coagulated like albumen, and the opaque flocculi which were held suspended in it were then precipitated in the form of clots. Auscultation detected nothing but the mucous râle in different points of the thorax; the heart seemed to be in its natural state: pulse small, a little frequent, no heat of skin. This patient had a great dislike for food, he passed but little urine, and was habitually constipated. We were struck with the state of emaciation of this person, in whom no important organ appeared seriously injured; the puffy appearance of his face, which was totally devoid of colour, his truely anæmic aspect, would make one take him for a person in whom excessive discharges of blood had taken place. (Decoction of polygala, with addition of kermes, Morton's balsamic pills; stimulating frictions over the extremities; blisters applied in succession over the chest and lower extremities.) We observed, for the two months following, the patient to become progressively weak; the expectoration continued; for the eight or ten last days of his life there was pain in the epigastrium, tongue red, nausea; increased temperature of the skin; death whilst making an effort to vomit.

Post-mortem. Lungs crepitating and healthy; some cellular adhesions of the two pleuræ, remarkable paleness of the tracheo-bronchial mucous membrane through its entire extent; healthy state of heart, pericardium, and great vessels. Considerable redness of the mucous membrane of the stomach towards the great cul-de-sac; whiteness of the rest of the digestive canal. A little serous infiltration in the sub-arachnoid cellular tissue of the convexity of the cerebral hemispheres.

This case appears to us very interesting, with respect to the state of the bronchi, the nature of the liquid expectorated, and the symptoms both local and general. If there be any case, in which we should admit the existence of a flux without preceding inflammation, is not this one? It seems natural to attribute to the copious evacuations, of which the bronchi were the seat, the progressive wasting of the patient. In the course of our observations we remarked the great analogy between the aspect of this person and that of patients who have suffered great loss of blood. All the other secretions were at the same time

null, or very scanty. The appetite, which according to theory should have increased, was totally gone, and the stomach seemed, by the state of the tongue, to sympathise with the rest of the system. Yet this viscus was inflamed towards the close, and it was of acute gastritis the patient died.*

56. There are other cases where it is no longer an abundant secretion a long time continued, which is the cause of the exhaustion of the patient. But it is all at once, under a form really acute, that a very abundant quantity of mucous, serous, or purulent liquid is secreted by the bronchial mucous membrane, so as to simulate sometimes an effusion, which suddenly makes its way out from the pleura through the bronchi. In cases of this kind, sudden asphyxia may be the result of the rapidity with which the liquid accumulates in the air-passages.

Case 17.—Acute bronchial flux producing death by asphyxia in an individual affected with pneumonia and chronic bronchitis.

A man, forty-five years old, having had, the preceding year, a pleuro-pneumonia, entered the La Charité, in August, 1820. Since his illness he had continued to cough; he complained of his respiration being habitually embarrassed; all the right side of the chest, when percussed, yielded a very dull sound. The patient lay constantly on that side; breathing short, cough frequent, with expectoration of a great quantity of opaque mucus, resembling the sputa of chronic bronchitis; pulse hard, but not frequent. Great emaciation, functions of digestive organs intact. Same state during the fifteen days following. All at once, on the night of the 15th of September, the patient awoke in a state of imminent suffocation, and expectorated in a very short time an enormous quantity of mucous sputa, which he seemed really to vomit. They united into a homogeneous mass of a greenish yellow colour, which flowed from the vessel, when inclined. However, this liquid being continually carried into the trachea and larynx, and filling them more rapidly than it could be expectorated, soon suffocated the patient.

Post-mortem. Grey and dry hepatisation of at least the two lower thirds of the right lung. In the summit of this same lung were found two small tubercles which were beginning to soften. On cutting into the lung, we saw to flow out from a multitude of small points a liquid similar to that of the expectoration. These were the divided orifices of a number of small bronchial tubes; so that this liquid occupied and obstructed all the divisions of the air-tubes.† The large bronchus, the trachea, and larynx, were equally filled with it. The left lung was healthy; the large bronchi of this side were full of the same liquid, which no doubt had flowed there from the bronchi of the right lung. There was none of it in the small branches. A cancerous vegetation, of a mushroom form, existed within the stomach, at about two fingers' breadth to the left of the pylorus, which was free.

In this case the excessive secretion which took place on a sudden on the inner surface of the air-tubes, had been preceded by a chronic bronchitis; it was only the expectoration usual in this disease, which, without any known cause, without any appreciable exasperation of the inflammation, became so abundant and so rapid all at once, that the patient died asphyxiated, as in the case where a purulent or sanguineous tumour opens into the bronchi.

* In this case, by availing ourselves only of the lights furnished by pathological anatomy, we could have acquired no notion regarding the cause, seat, or nature of the disease. For surely we should not explain it by the state in which the stomach was found. Here again is disturbance of function, without an appreciable disturbance of organisation.

† We found an exact resemblance between this description and that given by Van Swieten of the lung of a person who died asphyxiated, after having expectorated a great quantity of pus. *Mirabatur utique pus exire, dum cultello secaretur pulmonis substantia: non autem exibat pus magnâ copiâ simul, sed guttâ unâ vel alterâ tantum, ex dissectis nempe aspera arteriæ propaginibus.* (Comment. in Boer., Aph, tom. 4, p. 60.)

Case 18.—Serous flux of the bronchi, the sudden appearance of which coincided with the absorption of a hydrothorax.

A turner, thirty-six years of age, was admitted into the La Charité in the winter of 1820. He had an aneurism of the heart. His limbs were œdematous; and, besides, the sound was dull on the right side of the chest. (The method of auscultation was not then familiar to us.) There was no sign of pneumonia. This person was considered as labouring under symptomatic hydrothorax. For several days nothing new presented itself in this patient; he coughed as most aneurismatic patients do, and expectorated some mucous sputa. All at once he was seized with extreme anxiety; the breathing became momentarily very much embarrassed, and he threw up an enormous quantity of serous limpid sputa, like the white of an egg not boiled. These sputa came up so copiously that the patient seemed to vomit. This extraordinary flux continued for some hours. The following morning the breathing was easy; the patient felt quite happy at his own state; saying that he was freed from an enormous weight which pressed on his chest. But what was our astonishment, when, on percussing the chest, we found the dulness of sound on the right side entirely gone.

We do not by any means recognise, in this sudden discharge of liquid from the surface of the bronchi, the ordinary progress of an inflammation. This abundant secretion lasted but some hours, and ceased as suddenly as it appeared. Must we not here recognise another species of effort on the part of nature, similar, for instance, to that produced by sweat? It is a kind of fluxionary movement, the mechanism and proximate cause of which we are no doubt far from understanding, but which we should receive as a fact, and which, in particular, we should be careful not to confound with inflammation.

What was very remarkable in this case is, that, at the same time that a great quantity of liquid flowed from the surface of the bronchi, the serum effused into one of the pleuræ was reabsorbed. This is not the only example we possess of serous collections whose sudden disappearance coincides with the establishment of an abundant serous exhalation from another surface. Here is as marked an instance of it as the preceding. Except the exhaling surfaces which were not the same, the two cases have the greatest resemblance.

A young man who had had cough for some months was seized with an acute abdominal pain which continued for three or four days, then the belly became tumefied. The patient entered the La Charité during the September of 1822. Then the abdomen, which could be pressed without pain, was the seat of an evident fluctuation. This gastro-intestinal mucous membrane appeared healthy. This ascites was considered as consecutive to peritonitis. (The first day, leeches were applied to the anus; on the following days blisters to the lower extremities, aromatic frictions over the abdomen, diuretic drinks.) The dropsy did not diminish. Purgatives were tried. The patient took a mixture consisting of two ounces of castor oil, and half an ounce of syrup of buckthorn. This purgative produced copious evacuations: the first consisted of yellow liquid feces; then the following stools presented merely a limpid serum, slightly coloured yellow. An enormous quantity of serum was then discharged by the anus in the space of fifty hours; at the end of this time the abdomen fell, no fluctuation was perceived in it: the flux from the intestines then began to diminish, and at the end of some hours it ceased altogether. Subsequently this patient died of phthisis pulmonalis. Several convolutions of the small intestine were found united together by cellular bands similar to those so often found in the pleura.

Might we not in this case apply the precept of Hippocrates: *Quo natura vergit, eo ducendum?* The purgative which was given, after other remedies had been tried in vain, usually excites but moderate evacuations. Here, on

contrary, it gave rise to excessive purgation. It seemed that nature waited for but a slight artificial stimulus to produce on the surface of the intestine an abundant exhalation of liquid, the necessary result of which was to be the absorption of the peritoneal serum. The ancients would have had no hesitation in admitting, in the two preceding cases, the removal of the serum to the surface of the bronchi in one case, to the surface of the intestine in the other. We would not attempt to decide the reality of such a metastasis ; but we think it very possible. It certainly is not repugnant to the laws of strict physiology to suppose that a liquid absorbed in any one part of the body, and carried into the torrent of the circulation, may be separated from it in nature on another surface by a kind of eliminatory process. Thus the bile, retained in its excretory canals, re-enters the blood, and tinges all the secreted liquids. Thus prussiate of potash, which had been deposited in the cellular tissue, has been found on the one hand in the blood and lymph of the thoracic duct, and on the other in the serum and intestinal mucus (Fodere). It is then by a natural process that this salt had entered the blood, and it is by a natural process that it left it. Physiologists have now discovered in the sweat, in the urine, in the serous and mucous liquids, the different substances which they had injected into the veins ; the water which they introduce into the latter soon transudes on the surface of the serous membranes, &c. Surely, then, there cannot be any thing astonishing in seeing a liquid absorbed in the peritoneum leave the system with the urine, or with the intestinal or bronchial mucus.

57. We have hitherto seen the intensity of the dyspnœa in bronchitis without complication caused either by certain organic alterations of the bronchi, or by the accumulation of a great quantity of liquid in these tubes. There are cases of acute or chronic bronchitis, where without these causes existing, and without the possibility of discovering any other, the respiration presents such embarrassment, that the patients die rapidly in a state of asphyxia. We shall now cite instances of this kind.

Case 19.—Acute bronchitis—Measles—Premature disappearance of the eruption: fatal dyspnœa.

A baker, twenty years of age, of good constitution, living in Paris only for the last two months, and affected for the last five or six weeks with a slight diarrhœa, presented on the 10th of April all the precursory symptoms of measles — redness of the eyes, coryza, hoarseness, and cough. The same state on the three following days, On the 14th, the eruption appeared ; the patient kept his bed. On the 15th, the entire body was covered ; entered the La Charité on the evening of this day. The eruption was then confluent, and quite characteristic ; pulse hard and frequent ; redness of tongue and lips ; violent cough ; no other bad symptom. Towards the middle of the night the patient felt some oppression ; this increased rapidly, and on the following morning, the 16th, we found the patient in a state of half asphyxia ; eyes full and prominent ; face purple ; breathing short and very frequent, performed both by the ribs and diaphragm ; cough almost constant, some mucous sputa ; the chest, when percussed, sounded well in every part ; auscultation caused some mucous râle to be heard in different places. Of the eruption there remained only some pale spots just on the point of disappearing. The pulse preserved its frequency and hardness, and the tongue its redness. This group of symptoms seemed to indicate the existence of a pneumonia : however, the pathognomonic signs of this affection were completely wanting. Could a simple bronchitis, by its extreme acuteness or sudden exasperation, give rise to so intense a dyspnœa, and could this inflammation joined to that of the primæ viæ explain the very severe state into which the patient had so suddenly fallen. Be that as it may, the indications to be fulfilled were no longer doubtful. The internal inflammations

must be diminished and that of the skin recalled. To this end, twenty leeches were applied over each side of the chest and ten to the epigastrium. After the blood ceased to flow, a blister was applied to each leg. The skin was rubbed with volatile liniment.

Considerable relief followed this treatment: in the evening the breathing was much less embarrassed, cough easier, tongue lost its redness; however, the eruption had not reappeared.

17th. We observed nothing but the symptoms of an intense bronchitis. Breathing but very little hurried.

18th. Fever nearly gone, and the opaque appearance of the sputa announced the approaching termination of the bronchitis. All at once, in the evening, the breathing again became very embarrassed; he was bled to twelve ounces.

On the following morning, the dyspnœa was still considerable; frequency of the pulse increased. (Two blisters to the thighs.) All this day the state of suffocation increased more and more; on the 20th, there was lividity of the face, lips were of a purple tint, there was orthopnœa. One would have said that the patient was dying of aneurism of the heart. Died a little after the visit.

Post-mortem. The mucous membrane of the larynx, trachea, large bronchi, and their smaller divisions intensely red. In some parts of the first divisions of the bronchi there were found some white membraniform concretions similar to the false membrane of croup. The pulmonary parenchyma was sound and crepitated in every part of its extent; posteriorly it was engorged; heart healthy; clots of deep black in the right cavities. Stomach white, as well as the small intestine, which contained a considerable number of ascarides in its lower fourth. The cæcum contained some tricocephalous worms; its mucous membrane presented near the valve a red patch, from which three or four small conical vegetations were raised three or four lines long. The rest of the large intestine was white, and filled with liquid feces; liver engorged with blood; spleen large and firm. A great quantity of serum infiltrated the subarachnoid cellular tissue; cerebral substance not injected; the lateral ventricles, particularly the right, distended with much limpid serum.

This case would have been considered in former times as an instance of the repulsion of the measles. In the medical theories of the present day, the extreme difficulty of the breathing, the intense fever, and, in fine, the death by asphyxia, will be accounted for by the intensity of the bronchial inflammation; thence, also, the premature disappearance of the cutaneous eruption. This inflammation was abated for a first time under the double influence of the blood-lettings, and of the revulsives with which the skin was covered; but two days after the dyspnœa reappeared: it did not yield to another bleeding, and its constantly increasing progress terminated in the patient's death. It is certainly very uncommon to observe such a group of phenomena without lesion of the pulmonary parenchyma or of the pleuræ, of the heart, or large vessels. Is it not, however, very conceivable that an inflammation which attacks suddenly or with extreme violence so extensive a surface as that of the entire bronchial mucous membrane, should excite in the system as much disturbance, at least, as the inflammation of a circumscribed portion of the gastro-intestinal mucous membrane? Do we know sufficiently the nature of the change produced by the air on the blood, in order to know how far an intense inflammation of the small bronchi may not prevent this necessary change? thence, perhaps, the principal cause of the dyspnœa, the asphyxia, &c. In fine, those who admit the existence of nervous dyspnœa, and essential asthmas, might equally cite the preceding case in support of their opinion; they would say that they often saw the bronchial mucous membrane as intensely inflamed without any perceptible dyspnœa resulting from it; from this they would conclude that, in the present case, the dyspnœa was an essential disease, independent of the inflammation of

the bronchi. There was a time, also, when persons would not have hesitated to consider the worms found in the intestines as the principal cause of all the phenomena, so varied are the points of view in which one and the same fact may be regarded, so different are the consequences which each person may deduce from them, according as he is guided by such or such a theory.

One must be struck, no doubt, with the great quantity of serum which filled the cerebral cavities; however, the intellect remained intact to the last. If the patient had presented any signs of delirium, convulsion or stupor, these symptoms would have been at once referred to this effusion, which would then have been called acute hydrocephalus.

The inflamed state of the cæcum explains sufficiently the diarrhœa which existed for the last six weeks. This fact is perhaps of some importance, because we have rarely an opportunity of ascertaining the state of the intestines in cases of slight diarrhœa, which exist for a long time without causing either fever or any perceptible disturbance of the system.

Case 20.—Slight chronic bronchitis—Suppression of the running of an old sore—Fatal attack of asthma.

A man, forty years of age, had, for a long time, an extensive ulcer on the left leg. The part of the leg below this ulcer, as also the entire foot, were very much swollen and extremely hard; the skin became of a dirty grey colour; in a word, this limb presented many of the characters of elephantiasis. A considerable quantity of pus flowed habitually from the surface of the ulcer. This man had, for the last five or six months, a slight moist cough, which was not accompanied either by dyspnœa or pain of chest. Placed, by mistake, in a medical ward, this person had been in it for some days, and was going to pass into one of the surgical wards when he was all at once seized with extreme difficulty of breathing; we perceived, at the same time, that the surface of the ulcer discharged much less pus. The patient, who sat up in a state of inexpressible anxiety, entreated us in a panting voice, to free him from an enormous weight which pressed on the chest and was smothering him; the inspirations were short and very frequent, and convulsive at intervals. The pulse was moderately frequent and very weak. In vain we sought, either in the heart or in the lungs, for the cause of such alarming symptoms. The chest had in every part its ordinary sonorousness, except posteriorly in the left, nearly to the extent of some inches, where the sound was less clear; except in this point, where the respiration was weak and accompanied with a râle, the air was heard freely to penetrate every where the pulmonary vesicles. The heart and its appendages appeared to be in their natural state. We remained then in total ignorance of the cause of this dyspnœa, which, from time to time, became more intense. Bleeding, blisters, &c., did not diminish it. The following morning the difficulty of breathing went so far, as to threaten the patient with death by asphyxia. It was asked if the cause of the dyspnœa resided in the larynx? We thought we saw some analogy between this disease and œdema of the glottis; tracheotomy, the only remaining chance, was proposed. M. Roux performed it. It proved, however, unavailing; the oppression went on increasing, and that same night the patient died.

Post-mortem. The pulmonary parenchyma was sound, and crepitated, except posteriorly on the left, over a space nearly equal to the tenth part of the lower lobe, where the tissue of the lung was hepatised. The mucous membrane was red only in small patches. The heart and large vessels were healthy. Dissection of the left leg exhibited a lardaceous thickening of the sub-cutaneous cellular tissue, with necrosis of the tibia.

Here we cannot, as in Case 12, refer the asthma to the extent or intensity of the bronchial inflammation, for this inflammation was slight, and occupied but a

small portion of the mucous membrane. With respect to the partial hepatisation of the lower lobe of the left lung, it is probable that it was a chronic affection, and the principal cause of the cough which tormented the patient for the last six months. Admitting even that it was of recent formation, still it did not account for the dyspnœa. Certainly, if there is a case where the existence of a nervous dyspœna, or one without appreciable organic lesion should be admitted, it is this. The difficulty of breathing began to appear at the same time that the purulent secretion of the ulcer was suppressed. We shall merely note this coincidence of the phenomena without attempting to establish their connexion.

58. The very paucity of the cases in which no appreciable lesion can explain the asthma, seems to us an additional motive for our studying attentively the very small number of cases of this kind, which have been hitherto deposited in the annals of science. Unfortunately a contrary course is most frequently adopted; and, for the sole circumstance that a fact is found to contradict the ideas generally adopted, it is not taken into account, it is even forgotten, and similar facts must be multiplied, in order that it may acquire, in some degree, a tardy credence, that its importance may be appreciated, and useful results be derived from it.

Though the danger of suddenly suppressing exanthemata, or morbid evacuations of long standing, has, beyond doubt, been exaggerated, this suppression, however, does not always appear unaccompanied with bad consequences. It was experience then which led the physicians of preceding ages, either to act cautiously with respect to several of these exanthemata and evacuations, or to replace them, when they were suppressed, either by a cutaneous revulsive, or by purgatives. But this practice, it will be said, was based on theoretical ideas. What matters it, if it accord with the observations of facts? Here, besides, as in very many cases, the facts were probably collected first, and it was to explain them that theories were devised. This is not the only time that an ill-interpreted fact was subsequently considered as an inaccurate fact. Thus, to quote but one remarkable instance, the fibrous texture of the brain gave very great support to the hypothesis of the animal spirits. When this hypothesis had no longer credit, persons lost sight of the true anatomical fact which served to support it, and it was only after two centuries of oblivion, that this important fact was in some measure found again. But let us return to our subject.

M. Guersent has related two instances of dyspnœa, which suddenly became rapidly fatal, without the autopsy having detected any trace of lesion. "I saw," says this excellent observer,* "two children die of acute intermittent dyspnœa, accompanied by extreme frequency of the pulse, præcordial anxiety, and a dry cough. After examining the state of the different organs with the utmost care, I was not able to detect any organic lesion which could cause me to suspect that the lesion was any thing but symptomatic."

59. We might add to the preceding cases, as being one and the same disease in an infinitely less degree, the species of dyspnœa oftentimes observed, in a continued or intermittent form, either in young and plethoric persons, or in persons remarkably nervous. Young persons of both sexes, women affected with irregular menstruation, present very frequent examples of it.

Intense dyspnœa, genuine fits of asthma, have been sometimes seen to come on all at once, after a violent mental emotion, in persons whose breathing had been till then perfectly free. (See article *Asthma*, Dict. de Méd.)

60. Of these different cases of dyspnœa without organic lesion, some appear to us capable of being accounted for by a sudden sanguineous congestion, which, acting on the lung, must necessarily produce a greater or less difficulty of breath-

* Dictionnaire de Médecine, 18 vol. tom. iii. p. 126.

ing, just as by operating on the brain it occasions dizziness, loss of consciousness, &c. The others appear to us more particularly owing to a special modification of the pulmonary nervous system; these are true neuroses of the lung. How in any other way are we to explain those fits of dyspnœa which came on all at once, either under the influence of a strong mental emotion, or merely because the patients direct their attention to the state of their respiration, so that the best remedy for them is often intense distraction? Interrogate these patients on the sensation which they then experience, they will answer you that at the very moment when, ceasing to be distracted, they come to think of the dyspnœa which they previously felt, they experience within the chest a sensation of constriction of a particular description, the result of which is an invincible obstacle to the free entrance of the air into the lung, no matter what effort they may make to dilate the thoracic parietes.

We shall not push these considerations farther. If the existence of a sanguineous congestion, or of a neurosis, can explain the disturbance of the respiration, are these same causes sufficient to account for the fatal termination of several dyspnœas? If, notwithstanding so much labour, it has not been yet given us to comprehend thoroughly the mechanism of the functions of the lung, how circumspect should we not be, when we strive to penetrate the mystery of the derangements of such wheelwork! Let us remark, however, that according as the researches of pathological anatomy are carried on with greater care, the number of dyspnœas, without organic lesions to account for them, diminishes more and more. In support of this assertion, we shall relate here the following fact: —

Case 21.—Dyspnœa of long standing with dropsy—Absence of any lesion to account for it either in the heart or in the lungs—Alteration of the diaphragmatic and pneumogastric nerves.

A young man, twenty-four years of age, having for several years an engorgement of the lymphatic ganglions on both sides of the neck, unattended with pain, presented several of the rational signs of an organic affection of the heart, when he entered the La Charité, the beginning of March, 1826.

Face puffed and livid; purple tint of the lips and alæ nasi; œdema of eyelids; ascites, and very trifling infiltration of the lower extremities. The respiration was short and hurried, and performed chiefly by the action of the ribs; lying down in the horizontal posture impossible. The difficulty of breathing increased gradually; but it was principally during the last year, that the dyspnœa became painful to him; it had uniformly increased, in consequence of moist rainy weather. The chest, when percussed, resounded well everywhere; auscultation detected nothing unusual in the region of the heart, nor in any other point, which could lead us to suspect the existence of a disease of this organ, or of the great vessels. A mucous râle was heard in different parts of the chest; in other parts a dry sibilous râle; in other parts again the respiratory murmur was clear, but loud. For several months back the patient had been affected with a cold; he had never spit blood, and when we saw him, he had an expectoration rather scanty and merely mucous. The appetite was tolerably good, and there was habitually a little diarrhœa, without any abdominal pains. Pulse natural in every respect.

Nothing in this individual proved an organic lesion of the heart, and yet this lesion seemed to be announced by several of the symptoms, such as the appearance of the face, the dropsy, the orthopnœa. This dropsy presented, however, one circumstance not usually met with in cases of disease of heart; the lower extremities became infiltrated only subsequently to the ascites, and again they were very little so. We know, on the contrary, that dropsy depending on a

disease of the heart, begins in the majority of cases with œdema around the ankles.

Auscultation did not discover the cause of the dyspnœa either in the heart or lungs.

The following therapeutic means were employed: local and general bleedings; applications of blisters to the chest and lower extremities; diuretic drinks; frictions with tincture of digitalis, and squill wine.

During the following six weeks the state of the patient underwent no change; there was constant orthopnœa; the respiration was panting the moment the patient attempted to leave the bed for any time. Auscultation, which was frequently practised, gave us no new information; the cough neither increased nor diminished, nor was it very severe. We never observed any fever, properly so called. Nothing as yet indicated the approaching death of this person, when, without any appreciable change in his state, he was suddenly seized on the 1st of May with extreme dyspnœa; a tracheal râle soon came on, the breathing became embarrassed, as in apoplectic patients, and in a few hours he died.

Post-mortem. Nothing remarkable in the brain, or spinal cord. Heart and vessels natural. A small number of miliary tubercles scattered through the pulmonary parenchyma, which was in general engorged, but healthy and full of air. Some old cellular adhesions united the pleura costalis and pulmonalis of the two sides. The anterior mediastinum was occupied by a large mass of tuberculous lymphatic ganglions. Through the midst of this mass the two diaphragmatic nerves passed; it was impossible to trace them through the numerous ganglions which surrounded them and pressed them on all sides. They reappeared not far from the diaphragm; and from the place where they were disengaged from the ganglionic mass to their distribution in the diaphragm, these nerves were remarkable for their greyish colour, similar to that often presented by the optic nerve, which enters an eye for a long time wasted. In the abdomen numerous tubercles were scattered over the small intestine; some small and superficial ulcerations for the extent of some inches above the ileo-cœcal valve; a tubercle the size of a hazel-nut in the cortical substance of one of the kidneys; cellular adhesions between the diaphragm and liver, the tissue of which was healthy; the spleen was soft and tolerably large; considerable effusion of serum into the peritoneum; and, in fine, anteriorly to the vertebral column, an enormous mass of lymphatic ganglions which degenerated into tubercles, which forcibly compressed on the one hand the vena cava, and on the other hand the vena portæ, of which they surrounded the principal abdominal branches, as well as the trunk.

On each side of the neck, from the edge of the jaw to the clavicles, there was found a large chain of tuberculous lymphatic ganglions, like those of the thorax and abdomen. Several were interposed between the vessels and the nerves of the neck, and the carotid artery and jugular vein were found to be separated by these ganglions. With respect to the pneumogastric nerve, some inches below the point of origin of the superior laryngeal nerve, it became lost in a mass of ganglions, in the midst of which it was impossible to find it. It reappeared a little above the level of the clavicle, and was remarkable on both sides for its *flatness;* it supplied, as usual, the recurrent nerves. In the remainder of its extent, and particularly in those of its branches, which constitute a great portion of the pulmonary plexus, it presented nothing remarkable. Each axilla was occupied by a tumour the size of a large orange, which was formed of an assemblage of tuberculous lymphatic ganglions.

Besides the cause of the dropsy, which here seemed to reside in the pressure on the great venous trunks, this case is interesting, in consequence of the state in which we found several of the nerves which contribute to the functions of respiration, the diaphragmatic nerves on one hand, and the two cords of the eighth

pair on the other. M. Berard, sen., had already related the case of a person in whom no other lesion was found, to account for the great dyspnœa experienced during life, but a tumour developed in the substance of one of the diaphragmatic nerves. Here not only the two diaphragmatic nerves had undergone considerable alteration, which was sufficiently characterised by the greyish colour, and real atrophy of their inferior extremity; but also the two pneumogastric nerves were seriously compromised, as was manifestly proved by the flattening which they presented on making their exit from the lymphatic tumour, in the midst of which it was impossible to trace them. Now, if the experiments of phyiologists have proved, that after dividing the eighth pair of nerves, hematosis ceases to be duly performed, the lungs become engorged, and death supervenes at the end of a few days, should not the fact I have just cited be ranked in this order of facts? There was here a gradual diminution, and finally a cessation of the influence exercised by the eighth pair on the changing of venous into arterial blood; thence the constantly increasing dyspnœa, &c. If this cause of dyspnœa be not admitted, we must then admit that the very great difficulty of breathing observed in this patient existed without our being able to find in the dead body any lesion which could account for it; for I do not think that the tubercles, very small and very few as they were, could, in any way, account for this dyspnœa, which may be compared in intensity to that which manifests itself in the course of the most serious organic affections of the heart.

SECTION II.

OBSERVATIONS ON PLEURO-PNEUMONIA.

61. Inflammation of the pulmonary parenchyma is at this day one of the diseases best known. In the great majority of cases, its diagnosis is simple, and the treatment not at all complicated. However, the history of pneumonia still presents some gaps to be filled up, or at least some points to which it may be useful still to direct attention. Existing often without being accompanied with all the symptoms which usually characterise it, and often too, not revealing its existence by any of these symptoms, pneumonia then is of very difficult diagnosis. This latent form was, no doubt, described by Stahl and his successors; but new observations on this subject seem to us to have become necessary by the discovery of the method of auscultation.

In certain cases, on the contrary, several of the symptoms of pneumonia appear, though there is no real inflammation of the pulmonary parenchyma; and with respect to diagnosis, prognosis, and treatment, this description of pseudo-pneumonia must be carefully studied. Pneumonia may complicate other affections, or be complicated by them; this inflammation then often puts on, as one may say, a peculiar physiognomy, through which we must accustom ourselves to recognise it, in order to separate the phenomena which depend on it, from those which are foreign to it. Perhaps the attention of physicians, with respect to diagnosis and prognosis, has not yet been sufficiently directed to inflammation of the upper pulmonary lobes. Perhaps sufficient stress has not been laid, either on the double pneumonias, which attack the two lungs at one and the same time, or on the circumscribed pneumonias which exist only in some isolated lobules. After the species of pneumonias having been too much multiplied in former ages, have we not now fallen into the opposite excess? Must we, for instance, erase from the nosological chart, bilious or adynamic pneumonias? Must we reject in all cases the existence of a general inflamma-

tory state, which precedes the pneumonia, as in rheumatism this general state often precedes the articular inflammation ?

Pneumonia is one of the diseases, whose favourable termination seems to coincide most manifestly with the appearance of those disturbing movements of nature designated by the name of *crises ;* modern observers seem to us to have neglected somewhat this important point of the history of pulmonary inflammations. The termination of pneumonia, either by gangrene or by abscess, are not yet sufficiently known ; even their existence is problematic with some persons : science still requires on this subject new observations and impartial discussions. In fine, the treatment of pneumonia, so simple and so well traced in a number of cases, is, in several others, obscure and uncertain. It would be important accurately to determine by clinical examples, how far bloodletting may be carried with beneficial results ; at what period, or rather under what conditions we should abstain from it, and substitute revulsives for it; in what circumstances we may even have recourse to a treatment more or less tonic ?

In the cases to be now detailed we shall dwell on these different points.

CHAPTER I.

PLEURO-PNEUMONIA ANNOUNCED BY THE AGGREGATE OF ITS CHARACTERISTIC SYMPTOMS.

ARTICLE I.

PLEURO-PNEUMONIA IN THE FIRST STATE.

Case 1. — A factor, thirty-three years of age, felt on the evening of the 1st of February 1822, a pain below the left breast. In the night he experienced alternations of cold and heat, and coughed very much.

On the morning of the 3d of February, the second day of the disease, he presented the following state : — crepitous râle posteriorly on the left, from the level of the inferior angle of the scapula to the base of the thorax ; inspiratory murmur loud and clear every where else. Sonorousness of the parietes still retained. Sputa red, transparent, viscid, still detached from the vessel by inclining it. Cough not frequent ; pain below the left breast, increased by percussion, cough, and the inspiratory movements. Respiration high, accelerated, diaphragmatic. Pulse frequent and full ; skin hot and dry. Digestive functions intact ; — the diagnosis : *inflammation of the lower lobe of the left lung in the first stage.* A bleeding to sixteen ounces was immediately ordered ; in the night another bleeding to twelve ounces ; twenty-four leeches were applied to the left side.

On the next, *i.e.*, the 3d day, there was a perceptible improvement; breathing more free ; pain of side nearly gone ; nothing heard on the left but a little crepitous râle mixed with the inspiratory murmur which announces the free entrance of air into the pulmonary vesicles ; the sputa had lost their viscidity and reddish colour. The blood obtained at the two bleedings presented a very different appearance ; the blood taken in the morning presented a clot floating amidst a quantity of serum, and covered with a dense, thick, buffy coat ; the blood drawn in the night was formed, on the contrary, by a large clot without the buffy coat, and without any serum around it. The two bleedings were performed, however, in the same manner ; but when the first was employed, there was intense inflammation ; it had considerably diminished at the time of the second bleeding. Should we not connect the different appearance of the

two bleedings with the difference in the state of the lung? Be that as it may, it was evident that under the influence of a powerfully antiphlogistic treatment, the pulmonary inflammation had retrograded; there was no longer occasion to have recourse to an active treatment, and it was to be hoped that by the use of emollients, &c., the pneumonia would soon be completely resolved; but, towards evening, the symptoms became worse, and on the morning of the fourth day, we found the breathing very much hurried, the red sputa returned, and the inspiratory murmur entirely masked posteriorly on the left by a strong crepitous râle; the pulse was very frequent and hard; a bleeding to sixteen ounces was instantly adopted. The blood, as that of the first bleeding, was covered with a thick coat.

However, on the 5th day, no improvement took place. On the 6th the patient in a state of half-orthopnœa, could scarcely pronounce a few words with a panting voice; he expectorated with difficulty red and very viscid sputa: the same râle continued posteriorly; the sonorousness of the thoracic parietes was still preserved. (Twenty-four leeches to the chest; two blisters to the legs.) In the course of the day the patient was in a state of extreme anxiety; he complained of a smothering. In the night, the commencement of the 7th day, the skin till then dry, became moist, and was covered all the night with a copious sweat, which still continued the following morning. The state of the patient was wonderfully improved; the respiration was but very little embarrassed; the expectoration was merely catarrhal, pulse scarcely febrile; a marked crepitous râle was still heard.

On the eighth day, this râle, succeeded partly by the natural murmur of respiration, was no longer heard, except in some isolated points. The patient found himself very well, but though he no longer complained of dyspnœa, still we observed a slight acceleration in the inspiratory movements, which was in accordance with the signs furnished by auscultation. The pulse retained a little frequency without the skin being hot. The sweats had ceased for the last several hours. In a few days he was convalescent, and soon left the hospital.

The inflammation of the pulmonary parenchyma does not appear, in this case, to have passed the first stage, or that in which there is only inflammatory engorgement, without hepatisation. We observed some crepitous râle, without a diminution in the sonorousness of the thoracic parietes. If there were hepatisation, the sound would have been dull. Here is one of the cases where we cannot deny the great utility of auscultation; without it the diagnosis would have been much less precise, and the prognosis more uncertain. By the help of auscultation we were able to follow the different periods of increase and diminution in the inflammatory engorgement. We were aware that it was less, according as the crepitous râle was gradually replaced by the natural murmur of inspiration.

The other symptoms also confirmed the signs furnished by auscultation; they were ameliorated every time the râle diminished; and became worse every time this râle, by increasing, masked the inspiratory murmur.

An obvious amendment took place from the third day after the copious bleedings then employed; but as if, in spite of our therapeutic means, diseases were subjected in their course to certain laws of duration, which we cannot change, nature in some measure resumes her rights, and up to the seventh day the pneumonia ceased not to announce itself by symptoms more and more severe. The bleeding then resorted to had no beneficial result. The sixth day particularly, the prognosis seemed to be very unfavourable: the extreme embarrassment of the breathing, the patient's state of anxiety, were of very bad import. The seventh day, every thing was changed: a copious sweat took place; from that time the alarming symptoms disappeared, and the pneumonia soon proceeded

towards resolution. Can we rank among the number of critical phenomena the fluxionary movement which took place in the skin?

This case tends to confirm two points of the ancient doctrine of crisis: first, the exasperation of the symptoms before the appearance of the crisis; secondly, the period of the disease at which this crisis appears, the seventh day. It shows, in fine, that an active treatment does not always prevent the occurrence of crisis.

Case* 2. — A labourer, thirty-five years of age, entered the La Charité, labouring under slight articular rheumatism and acute bronchitis. Very little fever. Two bleedings within the space of forty-eight hours, caused the rheumatic pains to disappear; but the bronchitis did not yield. During the three or four following days nothing was given but emollient drinks. At the end of this time the patient having been exposed to a cold draught of air, fever reappeared, as also dyspnœa. Cough more frequent. The next day these symptoms continued; they were considered as the result of an exasperation of the bronchitis: fifteen leeches were applied to the lower part of the sternum. On the 10th, the difficulty of the breathing still increased, and the sputa became viscid and reddened. We were from thence set aright with regard to the real cause of the disease; we no longer doubted that the inflammation of the bronchi must have extended to the pulmonary parenchyma. Auscultation detected some crepitous râle in different points of the chest, both on the right and left. This râle existed only at isolated points of small extent, and in the intervals between them the entrance of the air into the pulmonary vesicles was distinctly heard. The sonorousness of the thoracic parietes was nowhere diminished. He was bled to sixteen ounces.

The 11th and 12th of April (the third and fourth day of the presumed invasion of the pneumonia), the râle was heard in a greater number of points, without the sound obtained by percussion becoming more obscure. The sputa acquired greater viscidity, and a redder tint; the fever was intense, dyspnœa moderate. — He was again bled on the 11th to eight ounces, and on the 12th a blister was applied to the fore part of the chest. The blood drawn on the 10th and 11th was covered with a thick coat.

On the 13th, the fifth day, the skin, till then dry, began to be covered with a gentle moisture.

On the sixth and seventh, continual sweats. State of the symptoms of pneumonia stationary.

On the eighth, continuance of the perspiration; diminution of the viscidity and reddish tint of the sputa; breathing less embarrassed; cough less; crepitous râle less extensive; pulse full, undulating, not frequent.

On the ninth, cessation of the sweat; return of the sputa to the catarrhal state; no longer any embarrassment of the respiration, which however is still a little hurried; merely a weak crepitous râle is heard in some points.

Tenth and eleventh days, this râle continues, with a little frequency of pulse. Patient now presents merely the symptoms of a simple bronchitis. To his emollient drinks some kermes is added, and a pint of decoction of the root of polygala.

On the tenth, the crepitous râle completely gone; the cough diminished progressively, and the patient soon left the hospital in perfect health.

In this patient, the commencement of the pneumonia was not the same as in the preceding. It was not announced by any pleuritic pain, nor any shivering, and it was at first thought that the bronchitis was merely exasperated by the cold to which the patient had been exposed. The existence of pneumonia,

* We shall omit a few of the less interesting cases contained in the original.—Tr.

however, was soon indicated by the appearance of the sputa. This pneumonia presented another peculiarity; it did not, as is usually the case, occupy a determinate portion of the lungs; it was in some way disseminated over a crowd of isolated points between which the parenchyma retained its healthy state, as auscultation showed us. It seemed that in extending from the bronchial mucous membrane to the pulmonary tissue, the irritation affected only the portions of this tissue which surrounded the most inflamed bronchi. There was, really, in this case a multitude of partial pneumonias.

Here, again, the appearance of a copious sweat towards the fifth day, coincided with an improvement in the symptoms; but instead of lasting only for some hours, as in the subject of the first case, and of bringing on a rapid improvement in the disease, this sweat lasted for nearly four days, and during this time the amendment was slow and progressive. After all the rational symptoms of pneumonia had disappeared, there still remained a little râle, a certain sign that the resolution of the inflammation was not yet complete. This residue of the râle disappeared on the twelfth day. The inflammation of the bronchial mucous membrane, which existed previous to the pneumonia, survived it still for some days. The sputa examined at these different periods, afforded information not less positive than auscultation regarding the state of the organs.

Case 3.—A woman, thirty-three years of age, had walked very much in very hot weather in Paris, the beginning of June, 1822. Whilst the body was inundated with sweat she drank an enormous quantity of water. She soon felt general illness, headache, &c., then her appetite was lost, and a copious diarrhœa set in. This diarrhœa lasted for eight or ten days; the patient kept her room, and took nothing but diluent drinks. At this time the purging ceased, and was succeeded by intense pulmonary catarrh. The patient entered the hospital in great prostration of strength.

When we saw her, for the first time, she was tormented by a frequent cough, with expectoration of frothy, transparent, colourless, and very viscid sputa. Inspirations more short and frequent; the chest, when percussed, sounded well in every part; respiration loud, but clear, Pulse frequent, and compressible; skin hot and dry. Tongue covered with a thick, yellowish coat; frequent nausea, with burning thirst; abdomen painful on pressure; diarrhœa succeeded by obstinate constipation. (Emollient ptisans and lavements.)

The next day (June 15th) dyspnœa increased; sputa presented a slight reddish tint; chest still sounded well everywhere, but some crepitous râle existed on the right, posteriorly, and laterally nearly over the entire extent of the lower lobe; in the other parts of the chest the air entered into the pulmonary vesicles with force and clearness. Features became sharpened, abdominal pain still continued; pulse more full. Thus the inflammation, which the preceding day seemed to be only in the bronchi, extended to the pulmonary parenchyma, and the co-existing irritation of the digestive passages had not lessened. (Bleeding to twelve ounces.) The blood presented a large soft clot, covered with a thin greenish coat.

A short time after the bleeding, the skin, which till then was dry, became moist, the oppression lessened, and the pulse became somewhat soft.

On the 16th there was a perceptible improvement; crepitous râle less, and the natural respiratory murmur was better heard. The sputa, still viscid, lost their reddish tint; the pneumonia seemed to progress towards a resolution. On the other hand the tongue was becoming clean, the abdomen had lost its sensibility; an alvine evacuation, of favourable appearance, had taken place. Fever still continued. (Emollient drinks.)

On the morning of the 17th the same state. In the evening a return of the symptoms of pneumonia; cough, dyspnœa, red sputa. In the night, slight delirium.

On 18th, great oppression; once more a well-marked crepitous râle; skin again resumed its dryness and burning heat.

From 19th to 22d, state of the pneumonia stationary; considerable stupor; tongue dry; abdomen tense and painful.

From 22d to 23d, a copious sweat appeared; in the course of the 23d, a manifest amendment of all the symptoms; disappearance of the red tint and viscidity of the sputa; dyspnœa less; râle diminished; pulse less frequent; intellect clear; tongue moist.

From this moment the state of the patient improved every day; the natural murmur of respiration returned gradually; no more sweats. On the 29th, full convalescence; still foul bitter taste in the mouth; no return of appetite; frequent borborygmi. A purgative was given which brought on copious alvine evacuations. The symptoms of gastric and intestinal disorder disappeared, and the patient left the hospital in good health about the 10th of July.

This case presents us with another new shade of pneumonia in the first stage. The subject of it, after having indulged in violent exercise under the influence of a very elevated atmospheric temperature, first presented the symptoms of mere lassitude. The entire system then appeared to be affected; and to affirm that this state of general illness was the sign of suffering in one particular organ, of a first degree of gastro-enteritis, for instance, would be, in our opinion, to go beyond facts. But the disease soon became really localised; the severe diarrhœa which came on, soon announced that the irritation was fixed on the intestines. A little after another organ was affected; but at the same time that the symptoms of bronchial inflammation became marked, the symptoms of intestinal irritation were seen to diminish and disappear: in fine, the signs of pneumonia presented themselves. The precise moment of the attack of this pneumonia it would be difficult to determine; no shivering announced its commencement, no pleuritic pain accompanied it, it insensibly took the place of a simple pulmonary catarrh. These circumstances assimilated this case to the preceding; in the latter the crepitous râle preceded the appearance of the pneumonic sputa. Here, on the contrary, the sputa were already very viscid, before auscultation had yet ascertained any thing; but as this great viscidity is often met in very intense bronchial inflammations, we could not affirm that there was pneumonia until the expectoration became reddened; then only was the crepitous râle heard. The chest constantly remained sonorous.

A perceptible amendment followed the bleeding; the gentle moisture which immediately followed the bloodletting was a very favourable phenomenon. However, as in the subject of the first case, the pneumonia, which had commenced to retrograde, soon became once more exasperated. At the same time the functions of the brain were disturbed, the tongue dry, &c. Thus the organs of the cranial, thoracic, and abdominal cavities, were simultaneously affected. No other active treatment was then employed except revulsives applied to the thorax and lower extremities. The disease remained for some time stationary; then a copious sweat appeared a second time. A sudden and permanent amendment coincided with this appearance.

We may remark the different appearance of the blood in this woman, and in the subjects of the preceding cases. In the woman, the clot was softer, and covered with a much thinner coat. The symptoms which manifested themselves in the part of the primæ viæ, during convalescence from the pneumonia, are also worthy of notice. We see they disappeared in consequence of the administration of a purgative.

Case 4. — A man, forty-six years of age, entered the La Charité, January 21, 1820. Exposed to cold and moisture for the entire of the 18th, he had some shivering in the evening, felt a burning heat all night, and raved on the

19th. This same day he began to cough. 20th, third day, intellect perfect, but increase of cough, slight dyspnœa, and fever. When we saw him on the morning of the fourth day, his state was as follows: — Respiration hurried; oppression; cough frequent, without pain, with expectoration of reddened, viscid, and transparent sputa. (These characteristic sputa existed only since the preceding day.) Crepitous râle, not entirely masking the inspiratory murmur beneath the two clavicles, from these to the level of the breast, in the hollow of the two axillæ, and in the two supra-spinous fossæ. Everywhere else the respiration strong and clear; sonorousness of the chest retained; can lie on his back; pulse frequent and full; skin hot and dry; tongue whitish; constipation. Diagnosis: *inflammatory engorgement of the summit of the two lungs.* (Bleeding to sixteen ounces; sinapisms to the legs in the evening; ptisans and emollient lavements.) Blood consisted of a large clot, without serum, covered with a thick coat.

The fifth day, the crepitous râle more completely masked the inspiratory murmur. It was audible on the right in the infra-spinous fossa; the two anterior sides of the chest appeared less sonorous; dyspnœa greater; sputa more viscid. Thus, on both sides the inflammation had made progress, and seemed to proceed towards hepatisation. Two bleedings were prescribed, one in the morning to twelve ounces, and the other at night to eight ounces. Blood coated with a large clot without serum.

The sixth day, same state. (Two blisters to the thighs.)

On the seventh day, oppression greater; speech panting; perceptible diminution of sonorousness below the two clavicles; weak crepitous râle, but without an admixture of the inspiratory murmur in the same points where it was heard on the preceding days. Sputa red, combined into one jelly-like mass, which is detached with difficulty from the vessel. Pulse very frequent, and very compressible; skin still dry; yellowish tint of the face. (Two blisters to legs; a pint of decoction of polygala.) On the eighth day, in the morning, delirium; alteration of the features. Death in the evening.

Post-mortem. The upper lobe of each lung presented a red vermilion colour, which contrasts with the greyish colour of the other lobes. From these same upper lobes an immense quantity of red frothy serum flowed on making an incision; their tissue more easily torn than that of the other lobes, and hardly crepitating, still floated on water. In other parts the pulmonary parenchyma was dry, except posteriorly, where it presented a little cadaveric engorgement; red colour of the bronchial mucous membrane of the upper lobes. Old cellular adhesions of the pleuræ; cavities of the heart filled with black liquid blood.

In this double pneumonia it may be remarked that it was the upper lobes which were attacked by the inflammation, and we think we have ascertained that, *cæteris paribus*, inflammation of these lobes is more serious and more formidable than even a more intense inflammation of the upper portions of the pulmonary parenchyma. It is very probable that, had the inflammatory engorgement existed in the two inferior lobes, the case would not have been fatal.

Here, besides, the pulmonary tissue was very near the state of hepatisation; it had already lost a little of its consistence: when pressed between the fingers it scarcely crepitated, and in this state it resembled very much the sensation experienced on pressing the lungs of a fœtus which has not respired. This intermediate state, between simple engorgement and hepatisation, had been announced by the greater and greater diminution of the râle, without the simultaneous return of the natural souffle of respiration, as also by the diminution in the sonorousness in the thoracic parietes, without there being, however, real dulness. In fine, the great viscidity of the sputa was an additional sign that the pneumonia had a tendency to pass from the first to the second stage.

It may be readily understood how little to de depended on is the information furnished by percussion, when, as here, the sonorousness diminishes equally at once on the two sides of the chest, without there yet being well-marked *dulness*.

The attack of the pneumonia was not announced by any pleuritic pain ; the delirium which appeared almost at the commencement of the disease, and which disappeared according as the signs of pneumonia were more marked, re-appeared the last twenty-four hours of the patient's life. It cannot be accounted for by any appreciable lesion of the encephalon. In this particular case, the aphorism of Hippocrates is confirmed : *a peripneumonia phrenitis, malum.*

ARTICLE II.

PLEURO-PNEUMONIA IN THE SECOND STAGE. — RED HEPATISATION.

Case 5. — A carpenter, thirty-two years old, of a delicate frame, married about fifteen days, supped as usual on the evening of the 20th April, 1822. An hour after, he was seized on a sudden with a violent shivering, which lasted all the night. On the morning of the 21st, he felt a pain first in the top of the left shoulder, which soon extended to all the left side of the chest ; this pain was increased by coughing and by deep inspirations ; it became insupportable when he lay on the left side; at the same time dry cough and sweats at night. During the seven days following the patient kept the bed, and merely drank some demulcent drinks. The pain of side continued ; the breathing became more and more embarrassed ; the sputa were tinged with blood. On the 27th, the 7th day, he entered the hospital, and was bled immediately. He raved during the night. On the morning of the 8th day, he presented the following state : — Inspirations short and frequent; constant cough, with expectoration of a considerable quantity of red, viscid, transparent sputa. The pain, less acute than on the preceding days, was felt on percussion over all the left side of the chest, from the axilla to the last ribs. He lay on his back. The chest, when percussed, yielded a dull sound laterally and posteriorly over all the extent nearly of the lower lobe of the lung ; in some points of this same extent, a little crepitating rale was heard, without any admixture of the inspiratory murmur. From this double information, afforded by percussion and auscultation, it was concluded that the lower lobe of the left lung was partly engorged, partly hepatised. Pulse frequent, and tolerably resisting ; skin hot and moist. (Some sweats took place every evening from the commencement.) Tongue whitish ; loss of appetite ; thirst moderate ; constipation. (Bleeding to twelve ounces ; thirty leeches to the left side ; emollient ptisans.) The day passed off very well ; in the evening there was a profuse sweat ; delirium at night.

The morning of the 9th day, the delirium still continued, but the breathing was easier than the day before ; the sputa contained less blood ; the crepitous rale, perceptibly stronger and more extended than on the preceding day, seemed to announce that the hepatised parts of the lung passed again into the state of simple engorgement ; fever less. With respect to the pneumonia, the patient was evidently better ; but the existence of delirium announced a cerebral congestion, so much the more alarming, as it should have diminished, had it been merely sympathetic of the thoracic affection. Sufficient blood had now been taken, considering the delicate subject we had to do with. Two blisters were applied to the legs, as revulsives at one and the same time from the head and chest. The delirium ceased accordingly towards evening, and did not reappear.

On the 10th day, the same state. On the 11th and 12th days, the sound of the left side was less dull, and the crepitous rale was very well marked there. The patient no longer feeling any pain, could take a deep inspiration with sufficient ease; the sputa a little reddened, repassed to the cartarrhal state; the fever was moderated; in a word, every thing announced that resolution was taking place. On the 13th day, a blister was applied over the left side of the thorax. On the 14th and 15th days, we began to hear the natural sound of the respiration, mixed with the crepitous rale. Thenceforwards the dull sound began to disappear, the sputa were catarrhal. On the 16th, the natural sound of the respiration much more clear than on the preceding day, was no longer mixed, except and at some points and at intervals, with some crepitous rale; the pulse retained a little frequency, without any other sign of fever. There was no longer any sweats in the evening for the last three days. On the 17th day, the murmur of the respiration equally clear and natural every where; convalescence.

Let us fix our attention for some moments to the signs furnished here by auscultation and percussion. There was at first a dull sound, and at the same time a weak crepitous rale, without any admixture of the inspiratory murmur. From these signs we deduced the consequence that there was already hepatisation of the pulmonary tissue. At a later period, when the diminution of the fever, the dyspnœa less and less intense, the return of the sputa to the catarrhal state, the progressive re-establishment of the sonorousness of the thoracic parietes, announced the resolution of the pneumonia, auscultation accurately determined in a manner all the periods of this resolution, it showed us every day the pulmonary tissue, repassing by little and little from the state of hepatisation to the state of simple engorgement. The greater or less intensity of the crepitous rale, its greater or less mixture with the physiological murmur of respiration, apprise us of these different states of the lung with almost mathematical precision. If the crepitous rale is very strong, without mixture of the inspiratory murmur, we may be certain that in every part of the lung wherein it is heard, there is only simple engorgement, but that this engorgement is very considerable. If, with the rale, we still hear the murmur which results from the entrance of air into the pulmonary vesicles, we should conclude that there is still but simple engorgement, but that this engorgement is less considerable, and that several parts of the lung are still sound. There is a degree where the rale is no longer heard except in some isolated points, at long intervals, or else in a continued way, but so feeble, that much attention and practice are required to distinguish and appreciate it, amidst the murmur of the pulmonary expansion, which predominates in proportion as the rale diminishes; then the inflammatory engorgement is very slight or very circumscribed. At other times though the crepitous rale becomes more and more weak, the murmur of the pulmonary expansion is not re-established; then there is a transition from the first to the second degree, a mixture of engorgement and hepatisation. It rarely happens that, in the case where this hepatisation itself is considerable, a little crepitous rale is not still heard. In this latter case, the entrance of the air, and the resonance of the voice in the bronchi undergo modifications, from whence new signs result, on which we shall have an opportunity of dwelling hereafter. When the hepatised portions of the lung once more become permeable to the air, we are apprised of it by the return of the crepitous rale, or by its greater intensity, if it has continued. There is one circumstance which merits all the attention of the practitioner; it is, that very often the murmur of the pulmonary expansion remains mixed with a little crepitous rale a long time after all the other signs of the pneumonia have disappeared. What are we to conclude from this fact? Our inevitable conclusion must be, that the portions of lung which have been inflamed, ordinarily return to their natural state much more slowly

than could have been imagined before auscultation was practised; thence the facility of relapses in convalescence from pulmonary inflammations; thence all the great precautions necessary, as long as the râle continues. If they be neglected, the disease, having become latent in this latter period of its existence, may return unexpectedly to the acute stage; or else, as most frequently happens, a chronic inflammation will be kept up in the lung, and the tuberculous degeneration of this viscus will be the result, if the patient be at all predisposed to it.

Let us now consider some other remarkable circumstances connected with this case.

The sweats here were not critical: they appeared from the very first day of the disease, and continued to its decline. They might have favoured the successful termination of the pneumonia. This termination took place gradually, without being accompanied with any crisis properly so called.

The pleuritic pain might have been regarded, in consequence of its original seat (in the shoulder), as a mere rheumatic pain; but the intense shivering which preceded its appearance indicated its nature. It was by the absence or presence of the initial shivering that Stoll endeavoured to distinguish, in many cases, rheumatism fixed on the thoracic parietes, with cough and fever, from real pleuritis. How has this excellent observer said that one might draw a distinctive character from the state of the tongue? According to him it is moist in rheumatism, and *dry* in inflammation of the pleura. Nothing certainly is more inaccurate. This pain when transferred from the shoulder to the chest still presented in our patient an unusual circumstance. Instead of developing itself in a circumscribed point, on the level of, or below the breast, as is most usually the case, it extended to all the left side of the chest. It would, in my opinion, be hard enough to say, why in the greater number of cases, it is not so; why a general inflammation of the pleura does not mark its existence more frequently than *a painful stitch*.

The delirium, which appeared for several days in succession, yielded with rare promptitude to revulsives applied to the lower extremities at a period when reaction appeared no longer to be dreaded. This delirium did not exhibit any alarming character; and if one of our preceding cases confirmed the aphorism of Hippocrates, with respect to the danger of delirium in pneumonia, the present case disproves its uniform and constant accuracy. Besides, we know there are some persons in whom the slightest affection is complicated with delirium. Such perhaps was the case with our patient; his constitution altogether seemed to announce a great susceptibility of the nervous system, a susceptibility also which might have been increased by his recent marriage.

Case 6. — A tailor, twenty-one years of age, was affected with simple coryza on the 2d of March, 1824. The day after, at nine o'clock in the morning, he was seized, without any previous illness, with a stitch in the side below the right breast; in the day the pain continued, he had dry cough, slight dyspnœa, fever, sweat in the evening and at night. He entered the La Charité on the evening of the 5th. His state on the 6th (fourth day from commencement of the stitch in the side): sound dull in the right posteriorly through almost all the extent of the lower lobe. In this same part a feeble crepitous râle, without mixture of the murmur of pulmonary expansion; every where else the respiratory murmur strong and clear; cough frequent, with expectoration of reddened sputa, combined into a jelly-like mass, which cannot be detached from the vessel when the latter is inverted. Pleuritic pain perceptible only when percussion is employed. Respiration not appearing to the patient much embarrassed, though the inspirations are short and frequent. Pulse frequent and full, skin hot and dry (there was no more sweating since the 3d of March). We thought

that there was already hepatisation of the pulmonary tissue (large bleeding). Had some sleep at night, and slight transpiration.

On the fifth day there was perceived in the right, merely a very slight râle, without any murmur of pulmonary expansion; sound more dull than on the preceding day; every time the patient inspires, the entrance of the air into the bronchi of the inflamed portion of the lung is accompanied with a kind of souffle, entirely different from the murmur which results, in a healthy person, from the entrance of air into the pulmonary vesicles. It appeared that the latter having become impermeable, the column of air, which could no longer penetrate beyond the large bronchi, vibrated with more force against their parietes, whence resulted a respiratory murmur, very distinct from that which is heard in the portions of lung which remained sound. Finally, in the same hepatised part, the voice of the patient had a peculiar character, which was neither pectoriloquy, nor any of the varieties of ægophony; *it resounded more strongly than elsewhere.** No change in the other symptoms (bled to twelve ounces). The blood of the two bleedings was coated.

On the sixth day, auscultation and percussion yielded the same information. — Dyspnœa more considerable, sputa very viscid, and expectorated with great difficulty; pulse frequent and weak; great prostration. The increased difficulty of breathing induced M. Lerminier, notwithstanding the weakness of the pulse and the apparent state of general debility, to prescribe a third bleeding of eight ounces. It was coated as the preceding. Two sinapisms were then applied to the legs. (Expectorants of ipecacuanha and kermes combined, were given with demulcents.) We then left him with very unfavourable hopes of his state. In the night, the skin which, with the exception of the first day, had remained dry, or presented but very slight moisture, was covered with an abundant sweat, which still continued on the following morning.

Seventh day: a remarkable change now appeared in the state of the patient. A well-marked crepitous râle, mixed with the murmur of pulmonary expansion, had replaced the *bronchial respiration*, which the day before was still heard over all the inferior lobe of the right lung. The peculiar resonance of the voice in this same point had disappeared. The sputa had lost a considerable part of their reddish tint and their viscidity. The respiration was more free, the expression of the countenance more natural, pulse less frequent and less weak. The sweat continued till evening.

Eighth day: crepitous râle mixed with the natural murmur of respiration; both sides of the chest nearly equally sonorous. Sputa of simple catarrh; moderate frequency of the pulse; heat of skin natural. On the following days, total disappearance of the crepitous râle, which gave way to the natural respiratory murmur. Cessation of cough, and cure.

Unequivocal signs announced in this patient hepatisation of the pulmonary tissue. It existed already for four days; but as yet it was but of slight extent, or incomplete in several points. The fifth day it was more considerable. We have carefully described, and endeavoured to explain the two signs which indicated this dangerous progress, namely, the peculiar nature of the respiratory murmur, and the resonance (*retentissement*) of the voice. To express by a generic term the change which the respiratory murmur underwent in the hepatised lungs, we propose to call this murmur, so modified, *bronchial respiration*, in contradistinction to the respiratory murmur which is heard in the healthy state, which announces the free entrance of the air into the pulmonary vesicles, and which we would willingly call *vesicular respiration*. These phenomena coincided also with the *dulness* of sound, and great viscidity of the sputa. The

* This phenomenon was subsequently designated by Laennec under the name of *Bronchophony*.

difficulty of the respiration did not at first appear proportioned to the severity of the pulmonary lesion; but the dyspnœa soon became considerable, and from that time an unfavourable prognosis must be formed, which was still further confirmed by the bad appearance of the countenance, and the character of the pulse. However, in the space of twenty-four hours, at the same time that a very copious sweat manifested itself, the appearance of every thing changed; the inflammation, whose progress could not be arrested by a very active antiphlogistic treatment, retrograded with extraordinary rapidity from the second towards the first stage, and very little time was necessary to accomplish the resolution of so serious an inflammation. To deny that in this case critical sweats terminated the pneumonia, would be, we think, to deny evidence. We find here all the characters of a true crisis; greater exasperation of the disease, then a sudden and spontaneous appearance of a fluxionary movement towards the skin, and at the same time a manifest improvement in all the symptoms. This sudden change in the disease is one of the characters of critical phenomena. No doubt the pneumonia may have terminated favourably without any crisis having taken place: but this termination might probably have been much slower, and we would not have seen, in the space of forty-eight hours, an intense hepatisation of the lung give place to a slight engorgement, which also rapidly disappeared.

Let us not forget to note the period of the crisis, on the night of the 6th to the morning of the seventh day. It might have been favoured by the mixture of ipecacuanha and kermes which the patient had taken the day before.

The stitch in the side was not here preceded by shivering.

Case 7. — A porter, fifty-three years of age, felt on a sudden in his chamber, on the 17th of December, an acute pain in the anterior and right part of the chest, from the third to the seventh or eighth rib. This pain was very much increased in each inspiratory movement; it continued all night. On the 17th and 18th hot cloths and emollient cataplasms did not migitate it. The patient coughed frequently without expectorating. On the 19th he felt, for the first time, in the afternoon, a violent shivering, which was followed by great heat, without sweat. On the 20th, pain less; cough frequent and dry; 21st, same state: 22d, sputa tinged with blood. Having entered the La Charité on this day, he presented the following state: —

Face pale; movements free; can lie only on back or right side; cough almost constant; sputa combined into a transparent yellowish mass, detached from the vessel, when inclined. Pain only felt when he coughs, or makes deep inspirations. The patient does not feel his breathing embarrassed, though it is short and frequent. Percussion detects a diminution of sonorousness, to the extent of three or four fingers' breadth below the right clavicle. In this same extent, some crepitous rale is heard; every where else the breathing is distinct, but strong; pulse frequent and sufficiently full; thirst, loss of appetite; abdomen free from pain; constipation.

From this group of symptoms we could not mistake the existence of an inflammation of the summit of the right lung, with inflammation of the corresponding pleura. The pleuritis seemed to have existed alone for two days, and not to be complicated with pneumonia, till towards the end of the third day, at the time of the appearance of the shivering. This pneumonia also appeared to be passing from the first to the second stage. (Bleeding to sixteen ounces; emollient drinks and lavements.) The blood presented a thick coat with raised edges.

On the next day, 24th, the pain had entirely disappeared. The inspiratory movements were less frequent; cough less; sputa had lost their red tint, they were scarcely viscid. Percussion and auscultation gave the same information. However, the countenance of the patient betrayed great depression; pulse frequent and weak; skin not hot. (Two blisters to the leg.)

The 25th, reappearance of great dyspnœa, sputa very much reddened, and very viscid ; sound very dull under the right clavicle ; mucous rale in this same point. The inflammation had evidently attained a new degree of activity ; the very dull sound indicated hepatisation ; the mucous rale, resulting from the accumulation of a great quantity of mucus in the bronchi, prevented our discovering the state of the pulmonary parenchyma by auscultation. (Bleeding to eight ounces.) Blood as coated as that of the preceding bleeding.

26th. Breathing more free ; sputa less red and less viscid ; sound equally dull ; continuance of the mucous rale ; pulse moderately frequent ; sweat. (Emollient drinks.)

27th and 28th. Amendment still greater. Sweats.

29th. Sputa of simple catarrh ; sound still a little dull under the right clavicle ; nothing is heard in this part but some mucous rale. Pulse scarcely febrile. Patient felt no oppression ; however, he could not yet take deep inspirations, and he panted a little whenever he stirred. (Decoction of polygala.)

All the unfavourable symptoms gradually disappeared, and health was re-established about the 10th of January.

We have already pointed out in the course of this case the circumstances which render it particularly remarkable. We have seen that auscultation was of but secondary assistance in indicating the state of the pulmonary parenchyma. To be sure, some crepitous rale was first heard ; but after the kind of relapse which occurred on the 25th, the mixture of air and abundant mucus in the bronchi of the upper lobe of the right lung occasioned a rale which masked all the other sounds ; this circumstance is far from being rare, and it has often prevented us from availing ourselves of the stethoscope to establish the diagnosis of pneumonia. Before the 25th, the inflammatory engorgement appeared to predominate considerably over the hepatisation ; the latter became much more marked from the 25th to the 28th, as was proved by the great dulness of sound. Here, again, the disappearance of the different rational symptoms of pneumonia preceded that of the hepatisation : the latter appeared to exist still in a high degree, when there was no longer either fever, nor characteristic sputa, nor perceptible dyspnœa in a state of rest or in the ordinary inspirations.

The two bleedings, and particularly the second, were employed at a very advanced period of the disease. It is not long since the longer or shorter standing of the pulmonary inflammation chiefly guided practitioners in the employment of bloodletting. Pringle, who is unquestionably a high medical authority, laid it down as a general principle, that in pneumonia we should abstain from bleeding after the 5th day. The observance of this precept must have made many victims ; it would perhaps have caused the death of the patient now in question. Stoll was one of the first who proved, that to employ bloodletting in pulmonary inflammations we should have less regard to the period of the disease than to the nature of the symptoms ; the state of the respiration should particularly guide us. Severe dyspnœa calls for bloodletting much more imperatively than weakness of the pulse contraindicates it. How often, in fact, do we not see the pulse, small and weak before the bleeding, rise all at once, when after a large bleeding the respiration has become more free ! Oftentimes, also, after a copious loss of blood, we see the skin, which was previously dry, become covered with an abundant and salutary sweat. However, whatever be the advantage of copious and repeated bleedings in pneumonia, it should not be forgotten, that pushed too far and continued too long, the antiphlogistic treatment may be attended with serious consequences. When the inflammation has a tendency to pass to the chronic stage, revulsives to the skin, gentle stimulants given internally, very much assist in its resolution.

Case 8. — A woman, fifty-four years of age, was affected for about six weeks

with slight bronchitis. Towards the 15th of January the cough became more frequent and more painful. On the morning of the 18th, acute pain below the right breast, oppression, almost constant dry cough, sensation of burning heat, but preceded by shivering. 19th and 20th, the same state; the patient drank some mulled wine, with sugar and canella. 21st, diminution of pain, a little blood in the sputa. 22d, oppression still greater; vomited the wine, and refused to take more. On the evening of the 23d, she entered the La Charité, and was instantly bled; the blood was coated. On the 24th (the sixth day from the appearance of the pain) she presented the following state: —

Inspiratory movements short and very frequent, speech panting, cough not frequent; sputa reddened, combined into a jelly-like transparent mass, which adheres firmly to the vessel; sound dull on the right, anteriorly from the clavicle to the level of the mamma, and posteriorly in the infra and supra-spinous fossæ. The ear applied below the right clavicle hears a crepitous rale, very weak, and without the murmur of pulmonary expansion; posteriorly and under the axilla, bronchial respiration; every where else murmur of the pulmonary expansion very loud, with a mixture of mucous and sibilous rales in several points; pleuritic pain, felt only when percussion is employed, or when intercostal pressure is made, or cough; pulse frequent and weak, skin hot, constantly dry; tongue dry, a little red; abdomen free from pain and soft, slight diarrhœa, face yellow and dejected, decubitus on the back. Notwithstanding the advanced period of the disease, and weakness of the pulse, M. Lerminier ordered a bleeding to twelve ounces. Immediately after the bleeding two blisters were applied to the legs.

Seventh day dyspnœa still greater than the day before (bled to eight ounces; sinapisms in the evening); eighth day, extreme difficulty of breathing; she no longer expectorates; some mucous rale is heard all over the chest, arising from the accumulation of the matter of the sputa in the bronchi; pulse very frequent, and very compressible; skin not hot. (Blisters to the anterior part of the chest; decoction of polygala, kermes.)

Ninth day, tracheal rale; features very much changed; pulse very weak and intermittent; extremities cold; tongue red and dry. Death the following night.

Post-mortem. Red hepatisation of the upper lobe of the right lung; its tissue readily torn, and very granular, is precipitated on being put into a vessel of water. The other parts of the pulmonary parenchyma present a sero-sanguinolent engorgement, which seems to have taken place during the last agony. The bronchi generally red, and filled with liquid. Membraniform albuminous concretions cover the pleuræ pulmonalis and costalis: they had not yet contracted any adhesions. Heart contains black blood partly coagulated. The gastric mucous membrane presents in its great cul-de-sac a bright injection, with slight softening of its tissue. The end of the small intestines, and the cæcum also injected.

The *post-mortem* here leaves no doubt with respect to the connexion between the state of the lung and the signs furnished by auscultation, percussion, and the sputa. The signs furnished by auscultation were very characteristic the first time we saw the patient; the following days they no longer possessed any value, in consequence of the bronchial rale, which prevented us from distinguishing them.

When this woman entered the La Charité, she was no doubt in a very alarming state; however, she did not appear to be more seriously affected than several of the preceding patients, who perfectly recovered. Bloodletting was employed, the disease being also advanced, the state of the lung seeming to be the same, the weakness of the pulse being also considerable. In them the inflammation retrograded, after the bleeding, pulse became full, the strength was

raised. Here, on the contrary, the bleedings were unavailing, as were also the blisters and internal stimulants. Why was not this woman, placed as she was in the same condition, subjected to the same mode of treatment — why, I say, was she not restored to health? That is a question not soluble in the present state of science. Let us here repeat with Hippocrates: *in acutis morbis non omnino tutæ sunt prædictiones, neque mortis, neque sanitatis.*

We here find for the first time an example of suppression of the sputa, a circumstance generally very unfavourable, and almost a uniform index of a fatal termination. The matter accumulated in the bronchi becomes a powerful cause of asphyxia, in persons in whom the greater or less portion of the pulmonary parenchyma is already impermeable to air.

Case 9. — A water-carrier, fifty-eight years of age entered the La Charité the 9th of March. For the last three days he was affected with acute pain below the left breast; breathed with difficulty, and coughed without expectorating.— When we saw him for the first time (the 9th of March), a loud crepitous rale was heard nearly over all the lower lobe of the left lung; in this same part the chest when percussed sounded less than on the right. The patient, tormented by the necessity of coughing, dared not to do so for fear of increasing his pain. The viscid and transparent sputa as yet contained but some streaks of blood; the dyspnœa was not considerable; pulse frequent and full; skin hot and dry; tongue whitish, thirst. (Twenty leeches to the left side; bloodletting to sixteen ounces.) Blood not buffed.

10th (fourth day): dyspnœa increased; sputa more red and very viscid; crepitous rale feeble, without the admixture of any murmur of pulmonary expansion over the entire extent of the lower lobe of the left lung; crepitous rale, not intense, mixed at intervals with the natural respiratory murmur in the upper lobe of this same side; sound decidedly dull from the inferior angle of the left scapula to the base of the thorax. Thus the inflammation passed to the second degree in the inferior lobe, and the upper lobe began to present the first degree in some parts. The patient had still considerable strength. M. Lerminier prescribed two bleedings; one immediately amounting to twenty ounces, and the other in the evening to twelve ounces. Both presented a thick buffy coat.

On the fifth day the same state. Sixth day, extreme dyspnœa; sputa very viscid, and of a bright red; bronchial respiration, and peculiar resonance of the voice (bronchophony) on the level of the lower angle of the left scapula; sound very dull at this same point. On the anterior part of this side, from the clavicle to the breast, laterally in the hollow of the axilla, and immediately behind, above and below the spine of the scapula, crepitous rale very loud, with trifling mixture of the natural respiratory murmur. The pulse still retains considerable strength, the skin remains dry. This inflammation was still at its highest degree of acuteness, and though the bleedings employed up to that period seemed productive of but little benefit, it was only by drawing blood, however, that we could hope to arrest its progress. (Bleeding to sixteen ounces.) Blood very much buffed.

Seventh day, the ear applied to the points where the bronchial respiration existed the day before, could no longer hear anything, which seemed to us to indicate that the hepatisation had increased. Other symptoms as before. (Bleeding to eight ounces; two blisters to the legs.) In the evening, and during the night, the patient was delirious.

Eighth day, return of the pleuritic pain; sputa very copious, of a dirty grey colour; features altered; pulse very frequent and easily compressed; skin free from heat; diarrhœa. (Blisters to the left side; decoction of polygala; kermes.) In the evening, and during the night, return of the delirium.

Ninth day, suffocation imminent; suppression of the sputa; mucous rale on the two sides of the chest. (Two sinapisms to the knees.)

On the tenth day, he died a few hours after the visit.

Post-mortem. Red hepatisation of the lower lobe of the left lung, sanguineous engorgement of the upper lobe; membraniform albuminous concretions in the pleuræ costalis and pulmonalis of this side; effusion of a glass full of reddish serum into the pleura. Right cavities of the heart distended with clots of blood; sub-mucous injection of the intestinal canal. Redness of the mucous membrane itself at the end of the small intestine, and in the cæcum.

The increasing alteration of the pulmonary parenchyma may be accurately traced in this patient from day to day. At first the inflammation existed only in the lower lobe. At first a weak crepitous rale was heard in this lobe without the respiratory murmur; at this same period the sound was dull and the sputa very viscid. The existence of commencing hepatisation was not therefore doubtful. Subsequently, and still in this same part, the bronchial respiration manifested itself, and later still no sort of sound was any longer perceived there; then it might be affirmed that the hepatisation was complete and very extensive. In the upper lobe the engorgement, which was constantly increasing, but did not arrive at hepatisation, was announced by the crepitous rale. This rale never ceased to be heard; it became every day more marked in the direct ratio of the diminution of the murmur of the pulmonary expansion. At last a period came when the accumulation of a great quantity of liquid in the bronchi gave rise to a very loud mucous rale, which no longer allowed us to recognise by auscultation the state of the pulmonary parenchyma.

We may remark in this patient, as in the preceding, the constant dryness of the skin, a circumstance always unfavourable in pulmonic inflammation. We may also observe the number and copiousness of the bleedings, which were at first employed alone, and subsequently in combination with revulsives. Ultimately a period arrived when the latter alone were admissible.

Case 10. — A man, thirty-four years of age, of a strong constitution, had been labouring under a cold for some time, when, on the 15th of January, he was seized with a great shivering, followed by a burning heat without sweat. At the same time there was an increase of the cough and dyspnœa. From the next day the sputa became tinged with blood. On the 17th, he was blooded; the 18th, he entered the La Charité, and presented the following state: — Breathing short, hurried, but appearing to the patient very little interfered with; crepitous rale externally to, and on the level of, the right breast, extending also posteriorly to the lower part of the supra-spinous fossa; no perceptible diminution in the sonorousness of the thoracic parietes; cough frequent; sputa of a yellow colour, moderately viscid; pulse frequent and full; skin hot and dry. This group of symptoms announced an inflammation of little extent, and which was as yet but in the first stage. (Bleeding to sixteen ounces.)

19th. Same state. (Bleeding to eight ounces.) From the 19th to the 22d the inflammation appeared to progress by little and little towards a resolution. Every night copious sweats took place; they were very heavy on the night of the 21st, and morning of the 22d (from seventh to eighth day). No active treatment had been up to this period put in practice. The eighth day the breathing was free; expectoration catarrhal; pulse free from frequency; but a little crepitous rale was still heard on the level of the inferior angle of the scapula. Thus there still existed some engorgement which required for some time care and strict regimen. On the 23d, this rale continued. On the 24th, the patient, who thought himself completely cured, went into the walks of the

hospital, and was exposed to cold. The 25th, return of the dyspnœa and reddened sputa; very loud crepitous rale over all the lower lobe of the right lung; intense fever. (Bleeding to twenty ounces.) In the day the difficulty of breathing increased. Sputa expectorated with some difficulty.

On the 26th, face livid, like that of an asphyxiated person; crepitous rale very feeble, without any other murmur, and dull sound over the lower lobe; breathing panting; pulse very frequent. (Two bleedings in the course of the day, twelve ounces each.) 27th. Died in the afternoon.

Post-mortem. Red hepatisation of the lower lobe of the right lung; no trace of pleuritis; heart full of black coagulated blood; liver and intestines engorged with blood.

We see here a striking example of the danger of deviating from strict regimen before the complete resolution of a pneumonia. This inflammation was at first very mild; it had not passed the first stage. After lasting eight days, all the rational symptoms had disappeared; there only remained a little engorgement, which, it seemed, should soon disappear. It was then an imprudence was committed; the patient exposed himself to the action of cold. The pulmonary inflammation soon reassumed a new degree of intensity; in some hours it passed from the first to the second stage. In the space of two days the hepatisation took possession of the entire lower lobe of the right lung, and the patient died in a real state of asphyxia.

Case 11. — A sempstress, forty-seven years of age, of rather a delicate frame, entered the La Charité, the 2d of June, 1822. For the last five or six days she experienced all the symptoms of a pleuro-pneumonia; pain external to, and on a level with, the right breast; cough dry at first, then accompanied with bloody sputa; great oppression; fever. On the third day, twenty leeches were applied to the affected side. Having entered the hospital, on the fifth or sixth day she presented the signs of the two first stages of pneumonia; dull sound, and weak crepitous rale, without the murmur of pulmonary expansion, over almost the entire extent of the lower and middle lobes of the right lung; well-marked crepitous rale below the clavicle, and in the supra-spinous fossa of this side, with the murmur of the pulmonary expansion; sputa yellow, transparent, and so viscid, that when the vessel is inverted and shaken with violence, they cannot be detached; breathing short and hurried, not appearing, however, to the patient much affected; almost total disappearance of the pleuritic pain; pulse frequent and weak; skin hot and dry; slight diarrhœa, without any other sign of intestinal inflammation. (She was bled to sixteen ounces.) Blood was covered with a thick coat, surmounting a large clot, with but little serum.

June 3. Sound a little dull under the right clavicle; in this same part a weak crepitous rale, without any murmur of the pulmonary expansion; increased dyspnœa. (Bled to twelve ounces; and in the evening two blisters to the legs.)

June 4. Duller sound, and bronchial respiration under the right clavicle; in other parts of this side sound very dull; there is neither rale nor respiration heard. Pulse very frequent and small, without much heat of skin.

On the 5th, suppression of the sputa; mucous rale in all the right side; extreme dyspnœa. (Blister to the chest.) In the course of the day, delirium; cold sweats; dyspnœa still greater. Death in the night (towards the ninth or tenth day).

Post-mortem. Red hepatisation of the three lobes of the right lung; some thin albuminous concretions extending, in the form of filaments, from the pleura costalis to the pleura pulmonalis of the right side; right cavities of the heart very much distended with black coagulated blood; cerebral substance traversed

with a great number of red points ; red patches through the mucous membrane of the large intestine.

This is the first instance we meet of hepatisation of the entire of a lung. When the patient entered the La Charité, the signs furnished by auscultation and percussion announced the existence of this hepatisation, not yet complete, in the middle and lower lobes ; the upper lobe was as yet but engorged ; the following days it became rapidly hepatised ; but in this lobe the hepatisation was announced by the *bronchial respiration*, whilst in the other lobes, whose alteration however seemed to be the same, this characteristic sound was not heard. We think it right carefully to note these differences of signs afforded by identical lesions, in order that we may be accustomed to recognise these lesions, whatever may be the shades announcing them. Shall we refer to the great viscidity of the sputa, as connected with the degree of inflammation? To the dyspnœa, which, very considerable from the period of the patient's entering the hospital, and having then made constant progress, announced a fatal termination ?

Case 12. — A man, thirty-three years of age, entered the La Charité, December 18, 1822. He was of a full, plethoric habit, and for some time back experienced frequent headachs, transient dizziness, and some attacks of epistaxis. On the 16th, when getting up, he felt a general illness ; in the day, violent headach, tinnitus aurium, sensation of burning heat over the entire body. (Pediluvium.) 17th, kept his bed. On the 18th he presented the following state : face red ; eyes injected ; pulsations of the temporal arteries felt by the patient ; frontal headach ; general debility ; a sort of numbness of the intellectual faculties ; pulse frequent and full ; skin hot ; tongue whitish, with slight redness of the edges ; thirst ; anorexia ; abdomen soft and free from pain ; constipation ; urine scanty and red ; slight cough. After examining this patient attentively, we could not refer the symptoms to the sufferance of any organ in particular ; all the organs seemed to be simultaneously the seat of a strong excitement, without there being in any part real inflammation. This appeared to be, in some way, a higher degree of the plethoric state ; to give a name to this aggregate of symptoms we called it inflammatory fever. He was bled to twenty ounces.

The blood presented a large clot, of remarkable density, without the buffy coat. After the bleeding the headach diminished, whilst the other symptoms continued.

19th and 20th, cough increased, it came on in frequent fits, and resembled somewhat the cough which precedes measles (emollient ptisans, pediluvium).

On the night of the 20th the patient awoke in consequence of an acute pain, which, felt particularly between the right breast and sternum, radiated from thence as far as the hollow of the axilla. This pain became insupportable when he took a deep inspiration or made the slightest movement. On the morning of the 21st it was also intense ; the patient, though anxious to cough, dared not to attempt it ; he did not expectorate ; the breathing was short and hurried ; percussion not easily practised on him ; the respiratory murmur was heard in every part distinctly. The fever was intense. (Thirty leeches to the right side of the chest.) 22d, diminution of the pain ; slight crepitous râle below the inferior angle of the scapula of the right side. Dyspnœa increased, pulse frequent and full. (Bleeding to twelve ounces.)

23d. Sputa reddened, transparent, viscid, breathing more and more embarrassed ; crepitous râle on the right, over the entire extent of the lower lobe, and on the left below the clavicle, as well as immediately above and below the spine of the scapula. Sonorousness under the left clavicle, somewhat less than under the right. The blood drawn the day before presented a large clot

covered with a thick coat. M. Lerminier prescribed a new bleeding to sixteen ounces. The blood was coated as that of the preceding bleeding.

24th and 25th. The crepitous râle becomes more and more marked in the parts already mentioned, and in these parts the murmur of the pulmonary expansion is diminished in proportion ; the *dulness* of the sound is equally increased. The sputa have acquired very great viscidity, the respiration is more and more hurried. The patient lying on his back, cannot move or place himself on either side without dreading suffocation. The pulse, always very frequent, is more compressible ; skin hot and dry. 24th, two bleedings to twelve ounces each ; both were coated. 25th, a bleeding to six ounces, two blisters to the legs.

26th. On the right and left the crepitous râle has disappeared, which is succeeded, under the left clavicle, by the bronchial respiration, with loud resonance of the voice, and inferiorly on the right a mucous râle, so considerable, as to resemble the gurgling of tuberculous cavities. On both sides the sound very dull. Extreme oppression ; the sputa not abundant, and expectorated with difficulty, have the appearance of a thick, opaque, dirty reddish grey pea-soup, and adhere strongly to the vessel. Pulse frequent and weak ; skin hot and dry. Yellow tint of the face. (Two blisters to the thighs, kermes.)

27th. Mucous râle on both sides. 28th. Total suppression of the sputa ; extreme dyspnœa ; features sharpened and very much changed ; extremities cold. Died the following night.

Post-mortem. Red hepatisation of the lower lobe of the right lung and upper lobe of the left lung. Albuminous concretions of recent formation on the pleuræ costalis and pulmonalis of the right side. Right cavities of the heart distended with black coagulated blood. Venous injection of the gastro-intestinal mucous membrane ; liver and spleen gorged with blood.

We have here an instance of double pneumonia in the second stage, with pleuritis confined to the right. The commencement of this disease deserves notice. At first there was but a general affection, a sort of increase of the plethoric state, an inflammatory fever. In this state no organ was really inflamed ; but all seemed to be on the verge of it, as if they were all disposed to it by too rich and too stimulating a blood. The bleeding employed at this period had no influence, and soon after, the disease being localised, became a very serious pleuro-pneumonia, the fatal progress of which could not be arrested by a very antiphlogistic treatment. This case proves what we have already established elsewhere,* namely, that all diseases are not primarily local, that a febrile disturbance may exist independent of a local affection ; that inflammations themselves may be preceded by a general inflammatory state, of which the supervening inflammation is but in some degree the localisation.

The blood drawn before the appearance of the symptoms of pleuro-pneumonia was not buffed. It became so as soon as the pulmonary inflammation was established.

The sputa, before their complete suppression, changed their appearance. They became opaque, a dirty reddish grey colour, and stuck to the bottom of the vessel. We should always draw an unfavourable omen from the appearance of such sputa, which very much resemble the greyish sputa oftentimes formed in tuberculous cavities.

The skin remained constantly dry, and this circumstance again added to the unfavourable nature of the prognosis. With respect to the signs afforded by auscultation and percussion, they indicated with great precision the nature, seat, and extent of the pulmonary alteration.

* See the other volumes of Medical Clinic, and our work on Pathological Anatomy.

ARTICLE III.

PLEURO-PNEUMONIA IN THE THIRD STAGE (GREY HEPATISATION, OR SUPPURATION OF THE LUNG).

Case 13. — A shoemaker, sixty-seven years of age, entered the hospital the 6th of May, 1821. During the last fifteen days of April he had been affected with a cold. On the 1st of May he felt a slight pain towards the hollow of the right axilla; at the same time shivering, cough more frequent and more painful. On the 2d of May the pain no longer existed, but the breathing became embarrassed. On the 3d there was blood in the sputa. From the 3d to the 6th of May the dyspnœa increased. The patient drank every day several cupsful of broth, with a portion of wine; no other medical treatment was employed but the application of a blister to the chest. On the 6th he presented the following state: face yellow and altered considerably; breathing short and hurried; speech panting; sound very dull in the space included between the right clavicle and the breast, as well as in the hollow of the axilla of the same side. In this same space neither the respiration nor any râle is heard; lower down there is a râle which resembles the mucous much more than the crepitous râle; elsewhere the respiration is distinct and very loud; sputa like a thick solution of gum-arabic coloured a brownish red. From these sputa M. Lerminier announced the existence of pneumonia in the third stage, with purulent infiltration of the parenchyma. The pulse was frequent and weak, skin hot and dry. (Two blisters to the thighs, decoction of polygala.) Died the next morning.

Post-mortem. The upper and middle lobes of the right lung were dense, compact, and did not float in water. When cut into, they presented a mixture of red and greyish patches, unequally distributed through the substance of these lobes; where the former were found, the pulmonary tissue was in a state of red hepatisation; where the latter were found the parenchyma of the lung was reduced by slight pressure to a dirty greyish pulp, whence a liquid of the same nature flowed in considerable quantity. This liquid appeared to issue from a multitude of small, or as one may say, capillary bronchi. The lower lobe was but moderately crepitous; it still floated in water; from its tissue, which was a little more easily torn than in the natural state, there flowed a considerable quantity of bloody serum. The left lung was sound, a little engorged posteriorly.

This case, which is incomplete in many respects, by reason of the advanced period at which we saw the patient, is, however, not uninteresting. It shows us, combined in one and the same lung, the three degrees of inflammation from simple engorgement to purulent infiltration. In less than six days the pulmonary inflammation, which had been badly treated, terminated in suppuration.

The nature of the sputa should engage our attention. With a very few exceptions to be noticed in the recapitulation, these sputa characterise the third degree of pneumonia with as much certainty as the red and viscid sputa, of which we have hitherto spoken, characterise the first and second stage.

The inflammatory engorgement of the base of the lung was not really announced by any sign; the sonorousness of the corresponding thoracic parietes was not diminished; and with respect to the râle heard in this part it was not at all characteristic, it might depend solely on the mixture of the air and sputa in the bronchi.

Case 14. — A man, thirty-nine years of age, felt on the 9th of April, 1821, a violent shivering followed by intense heat; at the same time a stitch in the

right side, below the breast; cough frequent and moist. These symptoms continued the two following days. He was bled in the evening of the third day. On the morning of the fourth day, the time the patient entered the La Charité, he presented the following state: —

Countenance pale; strength tolerably well retained; intellectual and sensorial functions intact; inspirations short and frequent; sound dull on the anterior and right part of the chest, between the clavicle and breast; absence of all kind of respiratory murmur and râle in this same part; mucous râle very loud in nearly all the lower lobe of this same lung. The patient asserts that he does not feel his respiration embarrassed; however, he is unable to make a deep inspiration; sputa transparent, and very much reddened, combined into a gelatiniform mass, which cannot be detached from the vessel; pulse full and frequent; tongue white and moist; no stool. (Bleeding to twelve ounces, emollient drinks.)

Fifth day: state of the patient nearly the same, but the expectoration has changed its character: it consists of a brownish liquid, which escapes in one sheet (*en nappe*) when the vessel is inclined. (Third bleeding.)

Sixth day: features very much altered; eyes dull; delirium during the night. The patient felt himself very weak; answers accurate but slow. Sputa of the same kind as on the preceding day, but less abundant. (Blister to the part affected.) Death during the night.

Post-mortem. The upper and middle lobes of the right lung were in a state of grey hepatisation: from their tissue, which was soft and easily torn, there flowed a great quantity of greyish purulent liquid. The lower lobe presented a mixture of red hepatisation and engorgement; the left lung was healthy; the inner surface of the bronchi of the two lungs presented equal redness.

When the patient entered the La Charité, at the beginning of the fourth day, there was already red hepatisation of the upper portion of the right lung, as was proved by the signs afforded by auscultation, percussion, and the sputa; the bronchial respiration was not heard in this case. From the fifth day the new appearance presented by the sputa indicated the existence of the grey hepatisation. With respect to the mixture of the red hepatisation, and of simple engorgement observable in several parts of the lower lobe of the right lung, it did not perceptibly diminish the sonorousness of the corresponding thoracic parietes, and it could not be recognised by auscultation, by reason of the mucous râle caused by the accumulation of much serum in the bronchi of this lobe.

Let us recur to the characters of the respiration. Notwithstanding the extensive and serious alteration of the lung, the dyspnœa was never but inconsiderable; scarcely felt by the patient, it really was perceptible only to the physician. From this it might be concluded, that this person did not die of the increasing difficulty of the respiration, as most frequently happens; but that in him the venous blood receiving only in one single lung the modifications which constitute arterial blood, became unable to convey the necessary vital excitement to all the organs, together with the materials of nutrition.

Case 15. — A man, sixty years of age, a delft manufacturer, was employed in his usual occupation on the 23d of February. He went to bed in the evening in very good health, and awoke in the middle of the night with a violent shivering; he then felt a burning heat, and was seized at the same time with an acute pain occupying the inferior lateral part of the thorax, in the extent of the sixth last ribs; it increased by pressure, by coughing, and by taking a deep respiration. On the 24th this pain continued; the patient coughed very much, without expectorating; he became drowsy. On the 25th he began to expectorate a little transparent mucus, scarcely reddened; he entered the La Charité in the evening and was bled. At the visit of the 26th (third day), he presented the following state: —

No alteration of the features, movements perfectly free, strength still retained.

The patient assures us that he feels not the slightest oppression; however, the breathing was evidently hurried; inspirations short and frequent; speech a little panting. The chest, when percussed, yielded a dull sound on the right, posteriorly, over the entire space usually occupied by the middle and inferior lobes of the lung of this side; in this same part a well marked crepitous râle is heard; every where else the murmur of the respiration is loud and clear, and the sonorousness perfect. Frequent cough, accompanied by the expulsion of viscid, transparent, sputa, which combine into a gelatiniform mass, which as yet adheres but slightly to the vessel, and is scarcely reddened. The pain of side much less since the bleeding; fever slight. Tongue moist, and vermilion-coloured; thirst; anorexia; two or three liquid stools every day since the 23d. (He was bled to sixteen ounces forthwith: a second bleeding of twelve ounces three hours after.) The blood of both bleedings was buffed; that of the bleeding the day before was not so. He bore this double bleeding very well. In the afternoon the pulse was remarkably irregular; during the night the patient slept very well; he did not perspire.

On the morning of the 27th (fourth day), the state of the respiration was nearly the same as the day before. Auscultation and percussion gave the same information; the sputa, which were not viscid, were no longer tinged with blood; pains nearly gone, pulse frequent and compressible; skin, which was nearly of the natural heat, retained its dryness. Slight diarrhœa. (Bleeding to eight ounces.)

Fifth day: the patient appeared weaker than on the preceding days; however, he still sat up with ease. The inspiratory movements short and frequent were performed at once by a strong elevation of the ribs, and by depression of the diaphragm; a weak crepitous râle without any admixture of the murmur of the pulmonary expansion, was heard on the right on the level of the middle lobe of the lung; lower down, the ear, when applied to the chest, perceived the rising of the ribs; but there was neither râle, nor any respiratory murmur heard; there also, the chest when percussed yielded a sound much duller than on the preceding days. On the left, as well before as behind, and on the right anteriorly, the inspiratory murmur was clear and remarkably intense; the sputa were, as on the preceding day, very little viscid and scarcely reddened; the pleuritic pain was entirely gone; pulse small and irregular. (Two blisters to the legs: four grains of kermes.)

Sixth day: features very much altered; eyes dull; lips of a purple colour. The breathing was no longer performed except by small inspiratory and expiratory movements, which were very frequent. The sputa underwent a remarkable change; they were united into one liquid mass, similar to a thick solution of gum, in which there might be dissolved a colouring matter of a yellowish red, bordering a little on brown in some points. This expectoration we consider an unfavourable phenomenon. Auscultation detected the existence of bronchial respiration over almost all the upper and middle lobes of the right lung. This murmur was obviously distinct from the very loud murmur of the pulmonary expansion heard in the remainder of the lungs. The sound was always very dull on the right. The patient, when sitting in the bed, still executed some movements with ease and readiness. The pulse, which was very small, was much more frequent than on the preceding days; the skin remained dry; tongue whitish, slight diarrhœa. From the nature of the sputa, M. Lerminier announced the existence of the third stage of pneumonia. The very great dyspnœa still rendered the prognosis more unfavourable.

(Decoction of polygala; mixture with four grains of kermes.)

Two hours after we returned to see the patient; everything was now worse; he was in a state of asphyxia; face puffed and violet-coloured; extremities cold; intellect intact; pulse so frequent that it could not be counted. On then auscultating the chest, we only heard in all its points a very loud gurgling in con-

sequence of the accumulation of mucus in the bronchi. This bronchal râle soon became tracheal, and the patient died in the course of the day.

Post-mortem. The lower lobe of the right lung, presenting a tissue soft and easily torn, was reduced by slight pressure into a greyish pulp, whence a purulent liquid of the same colour flowed. In the middle lobe there was found a mixture of this purulent infiltration, or grey hepatisation with the red hepatisation, and in a small number of points only engorgement in the first stage. The upper lobe was sound, as well as the left lung, which posteriorly presented cadaveric engorgement. False membranes were interposed between the middle and lower lobes of the right lung. The right cavities of the heart were gorged with black blood.

The stomach presented a bright redness on its inner surface, towards its great cul-de-sac, to the extent of about three or four fingers' breadth in every direction. There the mucous membrane itself was red, and more easily torn than elsewhere. The termination of the small intestine and the cæcum were injected. The liver was gorged with blood.

The pneumonia presented no serious character up to the fourth day. Up to that period, the aggregate of the symptoms announced merely an inflammation in the first stage, with some points, perhaps, of red hepatisation. Copious bleedings had been employed; the sputa were already tending to return to the catarrhal state, and everything seemed to announce a favourable termination. From the fourth to the fifth day, the appearance of every thing changed; the dyspnœa, which was then slight, became all at once very considerable, and auscultation taught us that there was very extensive hepatisation of the right lung; the dull sound also was sensibly increased. With respect to the sputa, they presented a remarkable anomaly; notwithstanding the rapid increase of the pulmonary inflammation, they had not become either more red or more viscid. In this state of things, would more bleedings have been of use? would they have arrested the progress of the inflammation, and prevented the disorganisation of the lung? when employed with a sort of profusion, at a less advanced period, they exercised but a very doubtful influence on the inflammation, which was then slight. What could be hoped from them now? Be it as it may, they were not employed; and, guided by the paleness of the face, the diminution of the heat of skin, and the smallness of the pulse, blisters were applied to the lower extremities; kermes was prescribed; but this new mode of treatment was ineffectual. The next day, the 6th, the grey hepatisation was announced by the appearance of the sputa. Thus, in the space of forty-eight hours, the pneumonia passed from the first to the second and third stage. In forty hours the pulmonary tissue passed from the state of simple engorgement to that of suppuration.

The signs furnished by auscultation were not the same the fifth and sixth day. At first the incomplete hepatisation of the middle lobe was announced by a weak crepitous râle, without mixture of the murmur of pulmonary expansion; the complete hepatisation of the lower lobe was announced by the absence of every species of respiratory murmur or râle. The sixth day, the *bronchial respiration* was heard. We have already stated that these varieties in the signs furnished by auscultation, depend either on the different degrees of hepatisation, or on the relation and connexion between the bronchi and the portions hepatised.

We shall note as an unfavourable circumstance, and one connected with the fatal termination, that during the entire course of the disease the skin remained constantly dry.

Need we remark the great irregularities of the pulse? Independently of the organic state of the heart, they were connected with a peculiar disposition of the individual, and should be considered but of secondary importance in the establishment of the prognosis.

Case 16. — A man, forty-nine years of age, had a cough for some days without presenting any other serious symptom, when he entered the La Charité during the April of 1824. The first day he appeared to labour merely under severe pulmonary catarrh. There was hardly any febrile disturbance. The breathing was free; the chest, when percussed, resounded well everywhere; auscultation detected nothing but the mixture of the mucous and sibilous râles in several bronchial branches, and great intensity of the inspiratory murmur. However, the sputa had an appearance which did not seem to accord with the apparent mildness of the other symptoms. They consisted of a liquid similar to a thick solution of gum coloured with a brownish red, such as are seen in the third stage of pneumonia. The next day, 7th of April, the expectoration continued; but there was now a greater acceleration of the pulse, more intense heat of skin, and considerable embarrassment of respiration. Percussion then detected a dull sound on the level of the right breast; we there heard a weak crepitous râle without mixture of the murmur of pulmonary expansion. The existence of pneumonia was no longer doubtful. (Bleeding to twelve ounces.) Blood not buffed.

8th of April, dyspnœa increased, sputa still retaining their brownish red appearance; sound dull from the right breast to the clavicle of this side, and over this same extent, bronchial respiration with resonance of the voice. Pulse weak; skin free from heat; face yellow and dejected. (Two blisters to the legs.)

9th. Delirium; tracheal râle; pulse weak and not frequent; extremities cold. (Sinapisms, polygala, kermes.) He died some hours after the visit.

Post-mortem. The superior lobe of the right lung presented the red and grey hepatisation; the latter predominated towards the rest of the lung; the contrary took place according as we approached the summit.

This case presents a very remarkable circumstance — namely, the existence of the sputa of the third stage of pneumonia, at a period when no other sign could cause us to expect not only suppuration of the lung, nay, not even its simple inflammatory engorgement. It is very probable that then the grey hepatisation already existed in a circumscribed portion of the right lung towards its root; its little extent accounts for the absence of dyspnœa, and its seat explains the insufficiency of percussion and auscultation. From thenceforward, however, the murmur of pulmonary expansion was so intense, that one might suppose that an obstacle to the free ingress of the air existed in some portion of the pulmonary parenchyma. The following days the inflammation made rapid progress; it extended to all the upper lobe; from this moment there was no longer any obscurity in the diagnosis, and the autopsy proved the existence of this grey hepatisation, which the character of the sputa alone (abstracting from every other sign) had inclined us at first to suspect.

CHAPTER II.

PLEURO-PNEUMONIA, WITH THE ABSENCE OF ONE OR MORE OF ITS CHARACTERISTIC SIGNS.

ARTICLE I.

ABSENCE OF SIGNS FURNISHED BY AUSCULTATION AND PERCUSSION.

Case 17. — A man, twenty-seven years of age, of a weak constitution and subject to catch cold, was very much fatigued, and perspired on a journey he made on the 20th of October, 1821. On the night of the 20th he slept well.

On getting up out of bed he felt himself ill; and soon after felt a shivering, then a burning heat; he went to bed. At two o'clock, he was seized with a dry and frequent cough. In the night an acute pain of the side came on between the 10th and 11th ribs of the left side. He did not sleep, and coughed very much without expectorating. The (22d, 2d day) he began in the morning to spit a little blood. The breathing was not embarrassed; he lay on the right side, in order to avoid the acute pain which lying on the opposite side occasioned. He entered the La Charité in the evening and was bled. On the morning of the 23d, he presented the following state: —

Countenance dejected; headache; sensation of debility; decubitus on the back; frequent cough; sputa very much reddened, transparent, and combined into a jelly-like mass, which flows from the vessel when it is inclined. Acute pain on the level of the ninth, tenth, and eleventh ribs, increased by coughing, inspiration and percussion. The chest when percussed resounds equally well in every part. When auscultation is employed, the murmur of respiration is heard in every part clear and loud. Breathing hurried and short, though the patient assures us he feels no oppression. Pulse not frequent; skin hot and dry. Tongue yellowish; anorexia; abdomen free from pain and soft; no stool for the last two days.

The sputa were too characteristic to allow of any doubt regarding the existence of pneumonia; it was not, however, announced either by percussion or by auscultation. We concluded from this that the inflammation was but partial, and that it probably occupied the base, centre, or root of the lung. (Bleeding to twelve ounces; emollient drinks.) Blood buffed.

On the fourth day the patient found himself better; he had coughed little; the sputa, which were not viscid, contained less blood; respiration less frequent; pain no longer felt, except in making deep inspirations.

On the fifth day the patient, having exposed himself to cold when going to stool, was not so well as on the preceding day. The sputa were again red and more viscid, breathing very much embarrassed, extreme frequency of the pulse. The sound of the thoracic parietes continued clear, and the respiration distinct in every part. This return of the symptoms, and particularly the great dyspnœa, induced M. Lerminier to have recourse to a third bleeding of eight ounces, and to order in the evening two blisters to be applied to the legs.

Immediately after the bleeding, which was buffed as the preceding, the patient felt himself considerably relieved. In the afternoon a copious sweat appeared for the first time. He passed a good night.

On the sixth day there was a perceptible amendment. Profuse sweats had taken place during the day, and on the next day, the seventh, there remained no sign of pneumonia. The pulse was scarcely frequent; the respiratory murmur had lost that intensity, which approximates the respiration of the adult to that of the infant, and which indicates a greater or less difficulty to the free entrance of the air into the entire extent of the pulmonary parenchyma. The following days convalescence.

This case presents to us the absence of the signs ordinarily furnished by auscultation and percussion, and without which it is impossible to determine the seat and extent of the pneumonia. The expectoration alone announced with certainty the nature of the affection, which, without the sign, might have been taken for a simple pleuritis.

Let us remark also the mischievous influence made by the impression of cold, the appearance of the sweats coinciding with the general improvement, but not being here the cause of it in so striking a manner as in several of the preceding cases; and lastly, the termination of the disease on the seventh day.

Case 18. — A servant, thirty-eight years of age, habitualy enjoying good

health, having had, fifteen years, before, *a fluxion of the chest*, was in very good health when he arose from bed 15th August, 1822. At eight o'clock, being engaged in his usual occupations, he felt a pain in all the anterior and right side of the chest, which he compared to that which would be caused by the pricking of a number of pins. About twenty minutes after the pain of the side began to be felt, a violent shivering came on: it lasted up to two o'clock in the afternoon, that is, about five hours and a half, and was succeeded by a burning heat; no sweat took place. In the course of the day the patient frequently felt a desire to cough; but he did not venture to do so, on account of the cough increasing the pain. That same evening he entered the La Charité, and was immediately bled. In the night he slept a little.

State on the sixteenth, the second day: face red, eyes injected, slight headach, decubitus on the back or on the left side, continuance of the pain on the right side, increased by inspiration, by coughing, by moving, by lying on the affected side, but not exasperated by pressure nor even by percussion; cough frequent, dry, little dyspnœa; chest sonorous every where; murmur of the pulmonary expansion clear in every part, but louder on the left than on the right, a circumstance which appeared solely to depend on the less dilatation of the thorax on the right, by reason of the pain; resonance of the voice equal in all points. Pulse hard, more than 100; skin hot and dry. Tongue a little red; thirst, bitter taste in the mouth, constipation. Blood drawn the preceding day was covered with a thin greenish coat. (Emollient drinks and lavements.)

In the morning of the third day, expectoration of viscid, transparent, highly reddened sputa; in other respects, the same state as on the day before. (Bleeding to twelve ounces.) The blood presented no coat.

On the fourth day the respiration rather calm, pain no longer felt except on making deep inspiration, and considerable exertion; sputa less red and not very viscid; arterial pulsations no longer 100; no râle heard in any part. In the ordinary inspirations, the entrance of the air into the pulmonary vesicles was heard with more intensity on the left than on the right; but when the patient inspired more forcibly, the respiratory murmur became equally strong and loud on both sides.

In the evening the skin was covered for the first time with a profuse sweat. On the next day, the 4th, the pulse was scarcely frequent, the pain had entirely disappeared, respiration returned to its natural state; the expectoration was purely catarrhal. The sweat continued all the day. On the morning of the sixth day the skin was moist, the pulse still a little frequent: the sweat ceased in the course of the day. The seventh and eighth days the pulse retained a little of its frequency; it lost it entirely on the ninth. The patient then appeared entirely re-established in health, and soon left the hospital.

In this patient nothing was observed at first but simple pleuritis. The pain was remarkable for its extent; it preceded the shivering, which is not most usually the case. At first bleeding employed nine or ten hours after its appearance did not remove it. At the commencement of the third day some sputa of pneumonia appeared; they were the only sign which announced the extension of the inflammation to the pulmonary parenchyma. Here, again, auscultation and percussion were insufficient; or rather, this double method afforded, in some measure, but negative signs; the continuance of the clearness of sound, and of the loudness of the respiratory murmur proved that the pneumonia was deep-seated and not extensive; the less intensity of the respiratory murmur on the right than on the left was but the result, in a mechanical sort of way, of the diminished dilatation of the right side, in consequence of the pain. The next bleeding employed, on the third day, was followed by a marked amendment: towards the end of the fourth day a profuse sweat appeared, and continued on the next day; at the same time the pain completely disappeared, the expecto-

ration became catarrhal, and all dyspnœa ceased; but up to the eighth day the pulse continued a little frequent, and it was not till after this period that the complete return of the arterial pulsations to their natural rhythm appeared to announce the total resolution of the inflammation.

Case 19. — A man, forty-one years of age, of delicate constitution, said he had for the last eleven years repeated *fluxions of the chest*, all of them indicated by pain in the side, by cough, by oppression and spitting of blood.

On the night of the 24th of April, 1822, he felt some shivering, and at the same time wandering pains in the two sides of the chest; he coughed very much. On the 25th the pain and cough continued. He entered the La Charité on the evening of the 26th. Then the viscid, transparent, reddened sputa announced the existence of a pneumonia; the breathing, which was short, appeared to the patient a little embarrassed; the pain of the two sides had not diminished; decubitus on the back. The chest when percussed resounded well in every part; the respiration, when examined with the stethoscope, was heard every where very loud, but clear. Pulse frequent and strong; skin moist. He was bled to twelve ounces.

On the morning of the 27th, third day, pain felt only on the right, to the extent of four or five fingers' breadth below the breast. In other respects no other change had taken place. (Bleeding to eight ounces, ten leeches to the right side, emollient drinks.)

Fourth day, the patient no longer felt any thing but a very slight pain in deep inspirations. The breathing was but very slightly hurried. The reddened sputa and the fever continued; no sweat took place. Auscultation and percussion gave the same information. (Fifteen leeches to the anus.)

On the fifth day, respiration natural, little cough, catarrhal expectoration, pulse scarcely frequent. There was no apparent crisis; particularly the skin retained its dry state.

Sixth day, reappearance of the pain in the right side. Sputa again reddened and viscid; fever; however, the sonorousness of the chest and clearness of the respiratory murmur still continued. (Fifteen leeches to the right side.) The debility and emaciated state of the patient seemed to contraindicate general bleeding.

Seventh day, all the symptoms of return of the disease have now disappeared; on the following days, convalescence. Still the patient continued to cough; he was in a complete state of emaciation, which, up to the 12th of May, the time he left the hospital, seemed rather to increase than diminish. The chest, examined both by auscultation and percussion, presented no trace of any lesion of either lungs or pleuræ.

The great number of pneumonias with which this patient was affected in the space of a few years deserves remark. He was really predisposed to them; all the irritating causes which acted on him directed their influence towards the lung, and excited inflammation in it. But it might be supposed, in consequence of the constitution of the individual, that the cause of this predisposition resided in pulmonary tubercles. On the other hand, inflammations so frequently repeated must on their part accelerate the softening of tubercles and increase their number. When the patient left the hospital, he appeared to us, in fact, to be on the verge of pulmonary phthisis.

The nature of the expectoration left no doubt as to the existence of pneumonia. But what part of the lung was the seat of it? Here, again, as in the preceding cases, auscultation and percussion told us nothing in this respect. Here again, the increase in the intensity of the respiratory murmur alone must induce us to suspect the existence of an obstacle to the free entrance of the air into some portion of the lung.

The skin, which was moist on the second day, remained remarkably dry afterwards up to the termination of the disease. This circumstance seemed to us to augur unfavourably for the total and complete resolution of the inflammation. However, this resolution seemed to have taken place from the fifth day, when on the sixth, both the pain of side, and the reddened sputa, and the fever were observed to reappear. But, fortunately, this return of the inflammation was but temporary, and yielded to another bloodletting.

Let us for a moment fix our attention on the character of the pain which manifested itself at the commencement of the disease. Did this pain, which was felt at the same time on both sides, announce a double pleuritis?

Case 20. — A Swiss, forty years of age, of strong make, and habitually enjoying good health, had been affected with cough for eight days at the time of entering the hospital; he had no pain in the chest. At the time of his admission he had some fever; his breathing was but slightly hurried. The chest, when percussed, sounded well in every part; the respiration was heard to be clear and strong, with the mixture of a mucous and sibilous râle at intervals. One would suppose that the patient was affected merely with simple inflammation of the bronchi, if the viscidity and red tint of the sputa had not apprised us of the existence of an inflammation of the parenchyma of the lung. Tongue red, burning thirst, constipation. (Bleeding to sixteen ounces.) The blood almost immediately after being drawn was covered with a thick coat.

Next day, 11th of April, same state. (Twelve leeches to anus, emollient drinks and lavements.) On the 12th, breathing seemed to have returned to the natural state; sputa those of acute bronchitis; tongue lost its redness; pulse retained a little frequency. Thus, the symptoms of pneumonia had entirely disappeared; however, from the 13th to the 22d, the cough continued, pulse remained a little frequent, strength not re-established. (Blisters to the arm, emollient drinks, &c.)

On the 21st, the patient got some food. On the 22d the symptoms of pneumonia reappeared; sputa red and viscid; dyspnœa; sonorousness of the chest, and clearness of the respiration still, however, continued; pulse very frequent and small, skin hot, great prostration. Notwithstanding this last symptom, twenty-four leeches were applied to the anus.

On the 23d, the respiration was more free, the sputa had lost their red tint, and the strength returned. On the following days the skin of the sacrum was covered with an eschar, which made rapid progress, and was succeeded by a large ulcer. But, as if the irritation of the skin of the sacrum had produced a useful revulsion, the cough ceased completely; the slight frequency of the pulse, which still continued, might be accounted for by the extent of the ulcer. The natural appearance of the tongue, the appetite which the patient said he felt, the softness of the abdomen, the regularity of the stools, attested the healthy state of the digestive passages. In this state of things the indication pointed out was to support the strength, so that the system may be enabled to bear up against the profuse suppuration which was going on in the skin of the sacrum. (Watery infusion of quinquina, a little wine, &c., were given every day.) Under the influence of this treatment the ulcer assumed a healthy appearance, and progressed rapidly towards cicatrisation. The patient left the hospital in a few days perfectly restored to health.

This disease was at first but simple bronchitis; no pain of side indicated that pneumonia had set in; the dyspnœa was not greater than that observed in several cases of intense bronchitis. Auscultation and percussion gave no information; the respiration, however, was heard with unusual strength, and this circumstance alone indicated some lesion of the respiratory passages; but the sputa alone were sufficient to discover the nature of the disease. After they had disappeared, the bronchitis continued, accompanied by a febrile disturbance,

which caused us to dread a nucleus of inflammation in some point or other of the pulmonary parenchyma. In consequence of a deviation from strict regimen, in the midst of this kind of false convalescence, some symptoms of pneumonia reappeared; but they yielded to a small bloodletting, which, employed notwithstanding great prostration, caused the latter to disappear, instead of increasing it.

Case 21. — A printer, twenty-two years of age, entered the La Charité the 14th of June, 1820. For about the last three weeks he had had some diarrhœa. On the 11th of June he coughed very much, and felt himself so ill that he did not leave home. On the night of the 11th, he felt beneath the left breast a pain, not very acute, which was increased by coughing, and by deep inspirations. On the 12th and 13th, this pain continued; the patient was tormented by an almost continual cough; he kept his bed, and drank some eau de vie, which he vomited. Having entered the hospital on the evening of the 14th, he was bled forthwith.

State on the 15th: breathing short, hurried, much more diaphragmatic than costal; cough frequent, dry, excited by the slightest motion; continuance of the pain of side; chest sonorous; respiratory murmur clear in every part; pulse frequent and hard; skin hot and dry, tongue whitish, great thirst, abdomen free from pain and soft; from five to six stools for the last twenty-four hours. This person was considered to be affected with simple pleuritis. Thirty leeches were applied to the left side of the chest.

16th of June (fifth day), pleuritic pain gone; but the patient expectorated some viscid, transparent, red sputa. Dyspnœa considerable; fever intense. Percussion and auscultation gave no additional information; however, the inflammation of the parenchyma was not doubtful. (Bleeding to sixteen ounces; emollient drinks and lavements.)

Sixth day, increase in the viscidity of the sputa, which could no longer be detached from the vessel by inverting it; they were of a well-marked yellow colour.

Seventh day, reappearance of the pleuritic pain, but on the opposite side. Same appearance of the sputa; respiration panting; extreme anxiety; pulse very frequent; constant dryness of the skin. (Twenty leeches to the right side.)

Eighth day, pleuritic pain less; respiration more embarrassed. Still percussion detected no dulness of sound in any part; auscultation ascertained the murmur of respiration to be natural, but very loud. (He was bled to eight ounces; two blisters to the legs.) In the night he raved.

On the ninth day, the features, which were considerably altered, expressed the most intense anxiety; a double pleuritic pain existed, on the right, below the breast; on the left, near the hollow of the axilla. The inspiratory movements were short and very much hurried. The patient could neither speak nor move without exciting a painful cough. The sputa retained their great viscidity and yellow colour; the pulse, very frequent, was still hard. Notwithstanding the little success which had attended the numerous bleedings which had been adopted, M. Lerminier did not hesitate to have recourse to this measure again. He applied fifteen leeches to each side of the chest, and in the evening sinapisms to the lower extremities.

In the night there was still some delirium.

On the tenth day, the same state. On the eleventh, twelfth, and thirteenth days, the pleuritic pain was diminished on both sides; the breathing became less embarrassed; the sputa did not change character; profuse diarrhœa.

On the fourteenth day, the double pain of the side reappeared where it had previously manifested itself; difficulty of the respiration greater than ever. (Ten leeches on each side of the chest; two blisters to the thighs.)

On the fifteenth day, delirium; extreme dyspnœa; suppression of the sputa; mucous râle in different parts. Death the following morning.

Post-mortem. On the right and left, the pleuræ costalis and pulmonalis were covered with albuminous and membraniform concretions. Besides, about half a glass of turbid serum was effused into the right pleura. The tissue of both lungs was, in general, crepitating and healthy; but in a considerable number of points, more particularly towards their root and in their centre, the two lungs presented small red compact masses, which constituted so many partial hepatisations. In other equally circumscribed points, the hepatisation was not yet complete; but the pulmonary tissue, very much engorged, allowed itself to be torn with great ease; the bronchi were intensely red as far as their smaller ramifications. The mucous membrane of the termination of the small intestine, and of the cæcum, presented several small ulcerations, with redness of the membrane around them; the mesenteric glands corresponding to this portion of intestine were red and tumefied.

The *post-mortem* here showed the species of alteration which the pulmonary tissue may undergo in cases of pneumonia, where the seat of this alteration is not announced either by auscultation or percussion. The numerous partial inflammations which existed did not seem sufficient to occasion death. It is not to them, but rather to the double pleuritis, that we must attribute the fatal termination of the disease. The symptoms became truly alarming, the dyspnœa in particular considerable, and the existence of the patient compromised only at the time of the appearance of the double pleuritis, and particularly at a later period, when it again became exasperated. It will be seen how energetic the antiphlogistic treatment here was, and how unavailing it proved.

Case 22. — A man, thirty-seven years of age, travelled from Gueret to Paris on foot (ninety-two leagues) in six days; he already had some little cough when leaving Gueret; the wind blew with great violence. The 16th of March, 1820, the day before his arrival, he felt a general illness, and a great shivering, which lasted a part of the day and all the night of the 16th. On the 17th, he kept his bed. On the 18th, he felt on the right side of his chest, below the breast, an acute pain, which partly yielded to the application of warm cloths. Fever on the 18th and 19th; he continued to cough without expectoration. On the 20th, he entered the La Charité, and presented the following state: —

Countenance tranquil, presenting a slight yellowish tint around the nose and the orbits; sensorial and intellectual faculties intact; muscular strength tolerably good; decubitus on the back: breathing scarcely hurried. Deep inspirations increase the pain which still exists beneath the right breast. Perfect sonorousness, and respiration very clear on both sides; frequent cough; sputa yellow, viscid, and combined into one jelly-like mass, not very copious; pulse frequent and small; tongue moist and clean; thirst; anorexia; abdomen soft and free from pain; constipation. (Twelve leeches to the right side; emollient drinks and lavements.)

On the 22d (seventh day, reckoning from the appearance of the shivering), the yellowish tint of the face, more marked, has extended to the skin of the entire body; pulse very frequent; respiration not much affected; frequent cough; the expectoration has changed its appearance, it is watery and brownish. (Two blisters to the thighs.)

Eighth day, features altered and sharpened; extreme debility; inspirations short and frequent; respiratory murmur heard everywhere with strength; the chest, when percussed, equally sonorous in every part; no expectoration. Pulse frequent; skin hot; tongue moist and white; constant nausea; constipation.

Some hours after the visit the patient vomited same black substance; he

became very much sunk and his features altered. At four in the evening, he lay on the right side, his eyes closed, and mouth half open; pulse became thready, and skin burning hot; he died at five o'clock.

Post-mortem. The two lungs crepitated on their surface; they were engorged with colourless any frothy serum. On approaching the root of the right lung, its tissue was found reduced to a pulp of a greyish yellow, yielding under the pressure of the finger, and infiltrated with a purulent sanies. On ascending towards the summit of the lung, along its inner surface, some portions were found in a state of red hepatisation. The gastric mucous membrane presented, through all its splenic portion, several bright red dots. The two upper thirds of the small intestine were of a deep livid red colour, and contained twenty ascarides heaped up together in packets in the most inflamed parts, where they were surrounded by a reddish mucus.

Here, as in the preceding case, the seat of the pulmonary inflammation sufficiently explains why it was not announced either by percussion, or by auscultation. The sputa alone indicated not only the existence of pneumonia, but even the degree of the inflammation, and the existence of the grey hepatisation. This patient, as the preceding, did not die in consequence of the constantly increasing embarrassment of the breathing; in him, in fact, the dyspnœa was never very intense, which corresponded with the smallness of the extent of the inflammation. He died in a sort of adynamic state, as is often observed in persons whose pneumonia terminates in suppuration. His death must also have been accelerated by the severe inflammation seated in the intestinal canal. We may remark here how little marked the symptoms of this latter inflammation were.

We have now cited cases of pneumonia in which the expectoration was the only characteristic sign. Though isolated, this sign is of such value that it suffices to detect the nature of the disease. We shall now cite some cases of pneumonias without expectoration, or with anomalous expectoration.

ARTICLE II.

ABSENCE OF THE SIGNS FURNISHED BY EXPECTORATION.

Pneumonia sometimes runs through its different poriods, and terminates, either in return to health, or in death, without having been announced by any species of characteristic expectoration. At other times this expectoration only shows itself at the commencement of the disease, and is prematurely suppressed. At other times, in fine, the sputa, which we hitherto observed to accompany the third stage, and which announce it more positively than any other sign, are seen in the two other stages of the disease. Such are the limits of our knowledge, that every time we have collected a greater or less number of particular facts, and we wish to generalise their results, it rarely happens that more extended observation does not discover to us facts contradictory of the former. But as long as these latter are not numerous we should consider them only as exceptions to the general rule which we have laid down. How important it is then that the physician should familiarise himself with such anomalies of the morbid state, in order that he may accustom himself not to overlook a disease, because it happens not to be announced by its ordinary symptoms.

Case 23. — A brazier, eighteen years of age, of delicate frame, felt on the 10th of March, 1820, a great shivering followed by an intense heat. He commenced coughing the next morning, without any expectoration. On the third day the expectoration appeared; on this day he took an emetic. Slight purging since

that period. He entered the La Charité on the 13th of March, and on the 14th he presented the following state : —

Countenance tranquil and rather flushed ; decubitus on the back ; frequent cough ; respiration hurried ; slight oppression ; sputa transparent, and slightly reddened, adhering to each other, but readily detached from the vessel when it is inverted ; sound somewhat dull on the posterior part of the right side of the chest ; crepitous râle on the same side ; pulse full and frequent; skin hot and dry ; mouth clammy ; tongue yellowish and moist ; thirst considerable ; four liquid stools since yesterday morning. (Thirty leeches to the anus ; blister to each leg ; emollient drinks.)

On the next day, the sixth, breathing more hurried ; dyspnœa increased ; same dulness of sound; respiratory murmur gone in the parts, where some crepitous râle had been heard the day before ; the sputa, always transparent and but little reddened, were so viscid, that the vessel might be inverted and shaken violently without their being detached ; same state of the pulse ; four stools. Every thing announced hepatisation of the lung. (Twenty leeches to the anus ; two blisters to the thighs, &c.)

Seventh day, same state : sputa scanty.

Eighth day, respiration short, very much hurried ; great oppression ; percussion and auscultation afford the same information. Cough frequent, *no expectoration.* Pulse very frequent, strong and vibrating ; skin hot and dry ; tongue and lips red and dry ; three liquid stools ; urine scanty and red. (Bleeding to twelve ounces ; two sinapisms.)

Ninth day, patient pants ; each inspiration is short ; he *coughs without expectorating ;* he feels no necessity to do so ; pulse, which is also frequent, has lost some of its strength ; skin dry ; four stools ; same state of urine as on the day before. (Sinapisms ; decoction of polygala.)

Tenth day, a little crepitous râle again heard. (*Return of the second stage to the first.*) In other respects no alteration.

Eleventh day, breathing less hurried and a little deeper. Still *no expectoration*, though the cough is very frequent ; crepitous râle very perceptible in the right posterior part of the thorax ; sound equally dull. Countenance more tranquil ; tongue always red and dry ; purging continues.

On the twelfth, thirteenth, and fourteenth days, slow, but perceptible amendment of all the symptoms ; patient extremely weak ; no sweat. Purging continues. (One ounce of senega root for a pint of decoction, with the addition of two ounces of quince-seed ; tonic mixture with four grains of squill.)

On the following days the breathing became more and more free ; cough not frequent, and *always dry ;* sound dull, crepitous râle. Features are returning to their natural state : strength also returning ; tongue, less red, is becoming moist again ; purging continues. Same prescription. Diascordium at night.

On the nineteenth day the urine was slightly clouded. On the twentieth, twenty-first, and twenty second days, profuse sweats ; continuance of the crepitous râle and of the dull sound ; cough rare, and *it is constantly dry.* Pulse retains some frequency ; the purging has ceased.

On the twenty-third day, there was no sweat. The natural respiratory murmur begins to succeed the râle ; the patient feels very well. At last, on the twenty-seventh day, the respiration is heard equally well, for the first time, on both sides. Dulness of sound no longer exists ; the pulse has lost its frequency, and the patient went out on the thirty-third day, perfectly restored to health.

In this individual the expectoration at first presented its usual characters ; it appeared on the third day, then its viscidity increased, according as the pulmonary inflammation progressed. But on the eighth day, when the inflammation was at its highest pitch, the expectoration was suppressed all at once, and

was no longer re-established up to the termination of the disease. Here there was not merely a suppression of the excretion of the sputa, they really ceased to be secreted. The resolution of the pneumonia took place very slowly ; it seemed to be favoured by profuse sweats. From the tenth day, to be sure, the return of the crepitous râle announced a commencement of the resolution. But during the twelve or thirteen days following, this resolution made no progress ; the continuance of the dull sound, the nature of the crepitous râle, with which the natural respiratory murmur was not mixed, announced sufficiently that hepatisation still predominated considerably over engorgement ; at the end of this time profuse sweats appeared, and it was only then that a more complete and rapid resolution was observed to take place.

The bloodletting here was much less copious than in several of the preceding cases. A tonic treatment was adopted after the tenth day. It would be difficult accurately to determine what its influence was. It is certain that tonics were administered at a time when there were symptoms of intestinal irritation, and yet these symptoms were dispersed at the same time that the resolution of the pneumonia was effected.

Case 24. — A man, sixty-one years of age, felt general uneasiness on the 6th of June, 1820 ; there was constant nausea ; the same evening he had fever, cough, and dyspnœa. The same state all the night. The next day the symptoms of the preceding day assumed greater intensity, the patient began to expectorate. A physician who was called in prescribed an emetic, a blister to the chest, and demulcent drinks. Much bile was vomited.

The patient entered the La Charité on the 10th of June. On the morning of the 11th (fifth day), he was in the following state : countenance pale and dejected, general anxiety very great, decubitus on the back, great prostration, respiration very much hurried ; frequent cough with watery and brownish expectoration resembling prune-juice. The respiratory murmur heard very distinctly over all the left side. On the right some crepitous râle is heard in several points ; in other parts, and particularly inferiorly, nothing is heard. Sibilous râle at intervals. Pulse frequent, of moderate strength ; little heat of skin. Tongue covered by a thick yellowish coat : bitter taste in the mouth ; abdomen soft and free from pain ; alvine evacuations as usual. (Two blisters to the legs ; twelve grains of ipecacuanha. The preceding evening, a bleeding to eight ounces had been employed.)

The diagnosis was : pneumonia in the first stage, in the upper part of the right lung ; pneumonia in the second stage, and probably (from the nature of the sputa) in the third stage in several points towards the base of the same lung. The great prostration, extreme dyspnœa, and finally the nature of the expectoration, induced M. Lerminier to give a very unfavourable prognosis.

The patient died the next morning (6th day), at four o'clock.

Post-mortem. Red hepatisation of the lower lobe of the right lung. The middle lobe was partly engorged, and partly in a state of red hepatisation : the bronchi, of a very deep livid red colour, were filled with a brownish and frothy liquid, similar to the matter of expectoration.

This case is important, in as much as it proves that the watery expectoration, similar to liquorice or prune-juice, such as has been already described, may appear in the course of a pneumonia, though the lung may not be in a state of suppuration, and there was as yet but hepatisation. But this case, we repeat it, appears an exception.

It is not improbable that if, on the first day, this patient had been bled instead of being vomited, and of having a blister prematurely to the chest, he might not have died.

Case 25. — A joiner, twenty-three years old, of tolerably good constitution, was affected for the last two months with a rheumatic complaint, for which he took some baths at the Hospital Saint Louis. On the 18th of February, after being employed all the day at his usual work, he felt, at five in the evening, a general shivering, which was soon succeeded by a burning heat; during the night he began to cough. On the next day, he still went to take a bath; he went into it with a violent shivering, a stitch in the side beneath the left breast, and an increase of cough. He remained in this state and kept his room to the 22d; he drank eau sucrée and a little wine. Having entered the La Charité on the evening of the 22d, he was instantly bled. On the night of the 22d, he had for the first time a profuse sweat, which still continued on the morning of the 23d (fifth day). The chest, when percussed, then yielded a dull sound inferiorly on the right. A well-marked crepitous râle existed under the axilla of this side. Inferiorly there was complete absence of the respiration; the patient felt some oppression; his inspiratory movements were hurried and short; he coughed frequently and expectorated some watery sputa, similar in colour and consistence to prune-juice. The intercostal spaces on the right side, from the fourth to the sixth or seventh rib, were painful on pressure. Pulse frequent and full; tongue whitish; constipation (he was bled to sixteen ounces). The blood taken on this and the preceding occasion was covered with a thick coat.

On the sixth day the respiration was more free; sweats at night. On the seventh the patient felt quite happy at the amendment which had taken place. Inferiorly on the right the dulness of the sound was less, and some crepitous râle was heard. The respiration, which seemed scarcely embarrassed when the patient lay down, was singularly accelerated the moment he sat up. The stitch in the side no longer existed; the pulse was but moderately frequent; still the sputa retained their unfavourable appearance; sweats had taken place during the night. On the eighth day, the same state — sweats.

On the ninth, tenth, and eleventh days, the expectoration again became purely catarrhal. Under the right axilla, the natural murmur of the respiration had succeeded the crepitous rale; lower down, the latter was still heard, but with a mixture of the murmur of the pulmonary expansion. Frequency of pulse still continues; sweats every night (decoction of polygala). The respiratory murmur became more and more predominant over the crepitous râle. On the 14th day the latter was heard only in some points and at intervals; an abundant diarrhœa succeeded the sweats, and continued for the five or six days following. At the end of this time every thing announced a complete resolution of the pneumonia.

Here again, as in the preceding case, the pneumonia certainly did not pass the second stage, though the expectoration seemed to announce the existence of the third. The symptoms succeeded each other with much regularity. When the patient entered the hospital, there was simple inflammatory engorgement towards the summit of the right lung, and red hepatisation of a part of its lower lobe. This hepatisation soon returned to engorgement: but the complete resolution of the latter was a long time waited for; some crepitous râle was still heard, several days after the expectoration again became purely catarrhal. The sweats, which appeared at the same time that the state of the patient began to improve, were succeeded, on the fourteenth day, by copious diarrhœa. This ventral flux thus spontaneously established, accelerated probably the entire resolution of the pneumonia, and it might be ranked, with some foundation, among the number of critical phenomena. Few bleedings were here necessary; immediately after the second, the resolution appeared to commence, and from this moment the disease was almost entirely left to the vis medicatrix naturæ

alone. It is in cases of this kind that we have often seen the employment of blisters accelerate the resolution in a very perceptible manner.

Case 26. — A cook, fifty-six years of age, of delicate constitution, felt on the 5th of July, 1820, an acute pain below the right breast. He said he had coughed and expectorated on the following days. Having entered the La Charité on the evening of the 10th, he was bled. On the morning of the 11th (sixth day) he was in the following state: —

Breathing somewhat hurried; percussion painful, without dulness, over the entire right side of the thorax. The respiratory murmur, very loud and distinct on the left, was succeeded on the right, posteriorly and below, by a crepitous râle which did not entirely mask it; on the level of the scapula, and under the clavicle of the same side, the respiration was heard with as much strength and clearness as on the left; pulse was frequent and full, face red, strength still retained. The aggregate of these symptoms seemed to announce merely pneumonia in the first stage. However, we were struck with the appearance of the sputa, which, being easily expectorated, consisted of a liquid resembling prune-juice. (Twenty leeches on the right side; emollient drinks and lavements.)

The following morning, the seventh day, the sputa assumed an appearance corresponding to the other symptoms; they were slightly reddened and viscid, such as they usually are in the first stage of pneumonia. The state of the patient in other respects the same.

Eighth and ninth days, the respiratory murmur was heard more clearly where some crepitous râle had existed; the respiration was scarcely accelerated; pulse not very frequent; sputa retain the same appearance. On the following days the expectoration became purely catarrhal. He then became convalescent.

In this patient there was not even a commencement of red hepatisation; the pneumonia was so slight, that it required but a single bleeding, and the application of twenty leeches to the affected side. However, here again we observed the prune-juice expectoration. It showed itself, to be sure, but for a single day, and was then succeeded by the ordinary expectoration of the first stage.

Reflection on the three facts of anomalous expectoration which we have now cited, should convince us that, in pneumonia, the examination of the sputa can afford but greater or less probability, but never entire certainty, either with respect to the degree which the disease has attained or its termination. We now pass to cases of pneumonia not accompanied by any sort of characteristic expectoration.

Case 27. — A man, thirty years of age, entered the La Charité the beginning of September, 1819. He felt on a sudden an acute pain below the left breast. He had violent fever, breathed with difficulty, and coughed very much without expectorating; slight delirium in the evening; same state next morning. We saw him for the first time on the morning of the third day; face pale and dejected; decubitus on the back; inspirations short and very frequent. Sound dull over almost all the extent of the left side of the chest; cough frequent; expectoration purely catarrhal; pulse frequent and small. Every thing inclined us to think that a pleuritic effusion had taken place into the left pleura. (Bleeding to twelve ounces.)

Same state on the fourth day. (Large blister over the left side of the chest.)

On the fifth day, we found the patient in a state of extreme anxiety. He expressed by screams the pains which he felt; he referred the seat of them to the diaphragmatic region. *No expectoration.* Delirium during the night.

On the sixth day the features were seriously altered; the patient was pant-

ing; he had expectorated some transparent mucus, mixed with opaque striæ, as in acute bronchitis. Died on the night of the sixth.

Post-mortem. No effusion into the pleura; old adhesions on the left, between the pleuræ costalis and pulmonalis. The base of the left lung was united to the diaphragm by a soft albuminous layer not yet organised. All the inferior lobe of this same lung was in a state of grey hepatisation, and the superior in that of red hepatisation. The bronchial mucous membrane was of a bright red colour.

At the time this case was seen, the method of auscultation was not generally known; without it, it was impossible not to take the pneumonia here for an effusion; with it, it may be even doubted whether the mistake would have been avoided. In fact, the sound was so dull, from the first day we saw the patient, that there was every reason to think that at that time hepatisation was complete. What then could auscultation have told us? Either we would have heard neither the respiratory murmur, nor rale, nor particular resonance of the voice, which might have equally depended on a considerable effusion or an intense hepatisation; or else we might have heard the bronchial respiration, and that particular resonance of the voice which sometimes approximates to œgophony, sometimes pectoriloquy; but these signs present so many shades, that with the exception of the cases wherein œgophony is well marked, they could not, in our opinion, of themselves suffice to enable one to distinguish an effusion into the pleura from hepatisation of the lung. The case is otherwise when we see the patients before hepatisation is yet complete; then auscultation furnishes new signs, which, notwithstanding the absence of the characteristic sputa, leave no doubt regarding the existence of a pneumonia, as will be proved by the following cases: —

Case 28. — A mason, fifty-two years of age, entered the La Charité, June 21, 1822. He had but recently come to Paris, and then presented the group of symptoms which usually constitute what is called bilious fever; being treated with simple acidulated drinks, this man was completely convalescent in the beginning of July. He had contracted within the last few days a slight pulmonary catarrh; on the 6th of July, this catarrh became worse, and some febrile disturbance set in. On the 7th and 8th, frequent and painful fits of coughing, with a feeling of tearing behind the sternum; continuance of the fever. (Emollient drinks.)

On the 9th, the breathing appeared to be for the first time perceptibly hurried, and the fever was intense. Still the sonorousness of the chest was preserved, the sputa were those of simple catarrh; but auscultation detected a little crepitous rale with the admixture of the respiratory murmur, in the space included between the left clavicle and breast, in the hollow of the axilla, as well as in the supra and infra-spinous fossæ of the same side. Elsewhere the respiratory murmur was strong, and its great clearness was obscured in some points only by a little mucous rale. M. Lerminier announced the existence of an inflammation, in the first stage, of the upper lobe of the left lung. This inflammation seemed to have succeeded gradually to inflammation of the bronchi. (Twenty leeches below the left clavicle; bleeding to twelve ounces.) The blood was covered with a thick coat; the clot was small, and surrounded by a great quantity of serum.

10th. Same state. 11th. A crepitious râle, more marked, entirely masked the respiratory murmur; the sonorousness was a little diminished beneath the left clavicle. Thus the pulmonary inflammation had progressed: *still the expectoration remained catarrhal.* (He was bled to twelve ounces.) Blood coated as at first.

12th and 13th, no change, and particularly nothing characteristic in the sputa, which are small in quantity, and consist of a white thready mucus. (Blisters to the legs.)

14th. In the part above mentioned, corresponding to the upper lobe of the left lung, there was nothing heard but a very weak crepitous rale, without any mixture of the inspiratory murmur; beneath the clavicle, and in the hollow of the axilla of this side, the sound was dull, and the breathing perceptibly more embarrassed than on the preceding days. *The catarrhal appearance of the sputa still continues.* Pulse frequent and rather hard; skin hot and dry. *Hepatisation evidently commencing.* Again we have recourse to bloodletting. (*Bleeding to sixteen ounces.*) Blood coated, clot soft, readily dissolving in the serum.

15th, 16th, and 17th, the disease appears to remain stationary; *the sputa have not changed their appearance.* Nothing given but emollient drinks.

18th. State changed for the worse; sound very dull under the left clavicle. Between this bone and the breast, and posteriorly on a level with the spine of the scapula, the bronchial respiration is heard every time the patient inspires. When he speaks, the voice gives a remarkable resonance which does not exist in any other part of the thorax. This double modification of the respiratory murmur, and of the voice, was so marked, that we would readily have attributed it to the existence of an empty tuberculous cavity, if the other signs did not bring us off from this idea. The dyspnœa was considerable. The sputa were not characteristic. The pulse, very frequent, had lost its hardness. (A bleeding to eight ounces; blisters to the thighs.) Blood coated, clot large and very soft.

19th. The breathing was so embarrassed, that the patient could scarcely pronounce, with a panting voice, some few broken words; in other respects the symptoms were the same. (Sinapisms to the lower extremities.)

20th. Crepitous rale under the right clavicle. 21st and 22d, it continues. On the left we constantly hear the bronchial respiration and the resonance of the voice. The patient no longer expectorates. He died on the 24th, from the constantly increasing difficulty of breathing.

Post-mortem. The upper lobe of the left lung presented a red compact tissue, which sank in water, was easily torn, appeared to consist, when torn, of a great number of small red granulations pressed one against the other. The upper lobe of the right lung formed a contrast to the other lobes of this same lung by its very red colour, its less consistence, and the enormous quantity of bloody serum which flowed from it when cut into. The other parts of the pulmonary tissue were healthy. The bronchi, very red, were filled with mucus, which had accumulated from the time the expectoration was suspended. There was no trace of inflammation of the pleuræ. Black blood, partly coagulated, distended the right cavities of the heart. The liver and spleen were gorged with blood. The inner surface of the stomach and intestines was coloured with a considerable injection. The mucous follicles of the great intestine were remarkably enlarged.

We had no occasion here for the sputa characteristic of pneumonia to detect this disease. We have seen few cases where auscultation afforded such positive information, where we were enabled for a manner every day, by the help of this information, to trace the progress of the inflammation with such precision, that the sense of sight could not have been more faithful.

Before the employment of the double method of percussion and auscultation, the dyspnœa would have been the only sign which could incline us to recognise, or rather to divine, the existence of pneumonia. Pulmonary inflammations, without the characteristic expectoration, must very frequently have escaped the investigation of physicians. We must admire, in this respect, the great sagacity

of Stoll, who more than once was able to diagnose these latent pneumonias, merely from the characters of the respiration.

The absence of bloody sputa has been for a long time considered as a fatal sign in pneumonia. Van Swieten (*Commentaries on Boerhaave*) lays it down that pneumonia without expectoration is dangerous, by reason of the organic lesions which they leave after them either in the lung, on in other viscus. Cullen also thought that it was very rare to see pneumonias of this kind terminate in perfect resolution. These principles seem to rest principally on the theory according to which they looked on pneumonia as produced by a morbific matter which settled on the lung. If the two cases now given seem to confirm the opinion of Van Swieten and Cullen, that opinion will be invalidated by the two following cases.

Case 29. — A man, forty six years old, in the habitual enjoyment of good health, experienced for three weeks an acute pain in the left side of the chest, on the level of the six or seven last ribs of this side. It was increased by inspiration and percussion. The patient had no cough nor fever. This pain was considered merely as rheumatic, and was met by the application of twelve leeches to the side. It still continued; a general bleeding was equally ineffectual. It was removed by a blister. The patient being freed from his pain, was preparing to quit the hospital, when all at once his pulse became very frequent, skin hot, respiration short and frequent. At the same time he had slight cough; *expectoration purely catarrhal.* The respiratory murmur very clear in every part, except posteriorly and on the left side, where some crepitous râle was heard. The chest when percussed sounded well in every part. M. Lerminier considered as certain the existence of pneumonia on the left side. He prescribed a bleeding to sixteen ounces.

On the following day, his state was the same. On the third day sound a little dull posteriorly on the left; some crepitous râle still continues. Up to the ninth day, the chest, when percussed and auscultated, afforded the same signs, the fever, dyspnœa, and cough, still continued. The expectoration was constantly that of simple acute bronchitis. After the ninth day, the râle diminished, as well as the dulness of the sound; the respiratory murmur gradually resumed its natural clearness posteriorly on the left, and at the same time it diminished in the other points of the chest. He was soon perfectly restored to health.

The absence of all characteristic expectoration might have rendered the diagnosis of this pneumonia impossible, before auscultation was employed. Here, too, the pulmonary inflammation was rather slight; it probably did not pass the first stage, but it was remarkable for its long duration: after having remained stationary for several days, it diminished by little and little, without its resolution being hastened or favoured by any critical phenomenon. We may again remark the character of the pain which preceded the invasion of the pneumonia. Did it depend on inflammation of the pleura? After having resisted the bleedings, it yielded to the application of a blister over the seat of the pain.

Case 30. — A boy, sixteen years of age, of delicate constitution, entered the La Charité in the month of April, 1821. During the preceding winter, he had been engaged in work too distressing for his age and constitution. He had a cough for the last three weeks. At the time of his entering the hospital he had slight dyspnœa, and some fever. Posteriorly on the left, the chest when percussed sounded somewhat less clearly than on the right; there, also, there was observed a well-marked crepitous râle, without any of the respiratory murmur being mixed with it. From these signs it was reasonable to admit the existence of pneumonia which was passing from the first to the second stage. However,

the expectoration *was that of simple catarrh*. The weak constitution of the patient, the almost chronic state of the pneumonia, and particularly the little embarrassment in the breathing, induced M. Lerminier to employ but very little bleeding. The first day fifteen leeches were applied to the left side ; and on the following morning it was covered with a large blister, which was made to suppurate. No other medical treatment was employed.

During the fifteen days following, no perceptible change took place, then the sound of the left side became gradually clear, the respiratory murmur again became distinct, the cough ceased, the fever disappeared, and the patient left the hospital perfectly well towards the middle of May.

We have in this case a remarkable instance of those latent pneumonias, the invasion, progress, and symptoms of which present such obscurity, that without auscultation and percussion they would unquestionably be mistaken. Many affections of the chest, often considered to be simple pulmonary catarrhs, with fever, should be reckoned among pneumonias of this kind. Such a mistake would have no harm in it, if it did not more than once cause the employment of suitable therapeutic means to be neglected. This form of pneumonia, when left to itself, in consequence of its nature not being known, and therefore its danger not being recognised, has often been the source of fatal disorganisation of the lung, the production of tubercles in its tissue, &c.

There are latent pneumonias which not only are not announced by any characteristic expectoration, but in which the respiration itself does not seem to be at all interfered with. These pneumonias, *without expectoration and without dyspnœa*, are scarcely ever seen except in the course of other diseases. We shall return to them again.

ARTICLE III.

SIMULTANEOUS ABSENCE OF THE SIGNS AFFORDED BY AUSCULTATION, PERCUSSION, AND THE EXPECTORATION.

We have observed this case but once.

Case 31. — A tailor, fifty-one years of age, entered the La Charité, July 22, 1822. This man having been liable to catch cold for several years back, and having sometimes spit blood, coughed very much since the last fifteen days. On the morning of the 19th of July, he felt an acute pain between the left breast and sternum. At the same time, fever, cough more frequent and painful. On the 20th and 21st, the pain continued, and the breathing became embarrassed. On the 22d, his state was : breathing short and hurried ; speech panting ; a short almost continual cough, with expectoration of frothy mucous sputa. Continuance of the pain, which is felt a little in the epigastrium ; the chest, when percussed, sounds well every where ; the respiration is heard in every part to be loud and clear ; pulse frequent and hard ; skin hot and dry. This patient was considered as labouring under acute bronchitis, complicated with pleuritis on the left side (Bleeding to sixteen ounces ; fifteen leeches over the affected part ; emollient drinks.) Blood is coated.

Twenty-third (fifth day), the pleuritic pain was almost entirely gone ; auscultation and percussion gave nearly the same information ; the expectoration of no assistance in the diagnosis. However, the dyspnœa had increased very much, the fever was intense. (Fifteen leeches to the anus.)

On the sixth day, extreme dyspnœa ; face pale, and features sharpened ; pulse cannot be counted by reason of its great frequency. In other respects, total absence of pain ; some cough with catarrhal sputa ; sonorousness of the chest

retained; respiratory murmur clear in every part, but very loud. It appeared evident that neither the pulmonary parenchyma nor the pleuræ were affected. A simple bronchitis could scarcely be considered as the cause of such severe symptoms, and especially of such embarrassment in the breathing. By a negative mode of reasoning we were inclined to believe in the existence of pericarditis, though the pulse was perfectly regular, and the pulsations of the heart presented nothing unusual, except their extreme frequency. (Thirty leeches to the precordial region, a bleeding to twelve ounces.) Blood was coated. In the evening and all the night the patient raved.

Seventh day, he was comatose, and returned no answers to questions. The same symptoms with respect to the chest. (Two blisters to the legs.) In the course of the day the breathing became stertorous, and the patient died the following night.

Post-mortem. Subarachnoid cellular tissue of the convexity of the hemispheres very much injected with purulent infiltration; lateral ventricles distended by a great quantity of limpid serum.

The left lung presented near its base, and around the insertion of the bronchi, several points where its tissue was red, compact, and readily torn. In the right lung, nearly in the same places, there was also red hepatisation mixed with commencing grey hepatisation. The summit of the right lung was traversed with some tubercles, surrounded by a very healthy tissue. The bronchi were red and full of mucus; soft adhesions united the anterior edge of the left lung to the pleura costalis.

This case was curious by reason of the absence of all the signs which could have induced one to suspect the existence of a pneumonia. The latter however was real: occupying at one and the same time the two lungs, and having already attained in some parts its third stage, it occasioned great dyspnœa, which, in consequence of the absence of the other signs of pneumonia, one might with some reason refer to a pericarditis. We may repeat here after Morgagni: *Adeo in medicina facile est per ea ipsa interdum decipi, quæ facere videntur ad vitandas deceptiones!* (Ep. 20, par. 30).

CHAPTER III.

PLEURO-PNEUMONIAS COMPLICATED WITH OTHER AFFECTIONS.

Pneumonia would be but imperfectly understood, if it were observed only in individuals, where this disease was not complicated with any other. In this latter case, in fact, it often happens that the inflammation of the parenchyma has no longer the same physiognomy. It often supervenes during the course of other affections, and the time of its invasion sometimes escapes the most attentive investigation; it has already disorganised the lung, before the difficulty of breathing or the nature of the sputa marked its existence. In certain cases, some of its most characteristic symptoms lose their value; we shall see, for instance, in some of the following cases, the signs derived from the more or less free state of the respiration, from percussion and from auscultation, become entirely insignificant, in consequence of certain complications. Do other diseases, on the contrary, set in during the existence of pneumonia? The symptoms of the latter are often obscured, or singularly modified. But these different complications should be studied not only with respect to diagnosis, they are again of importance to be known, whether as aggravating the prognosis more or less, or as very much increasing the difficulties of the treatment. We shall speak in

another part of this work, of those latent pneumonias which appear so frequently during the progress of typhoid fevers, and which are one of its most disastrous complications; it often happens that these are not accompanied by any pain, dyspnœa, or expectoration; scarcely is even a slight cough heard. Here we shall cite cases of pneumonias complicated either with other diseases of the lung, such as chronic bronchitis, tubercles, œdema, or with affections of the heart, or with other inflammations, such as pleuritis with effusion, pericarditis, rheumatism, enteritis, peritonitis, variola. We have not unfrequently met some cases in which, under the influence of certain states of the system, of the scorbutic state for instance, there is observed a sort of passive engorgement of the lung, which may be taken for a pneumonia.

Case 32.—Chronic bronchitis complicated with pneumonia.

A man, sixty years of age, entered the hospital in February, 1824. He was affected for several years with a bronchitis, announced by a cough which returned by fits with expectoration of a very abundant puriform mucus. The respiration was habitually a little short; in other respects, this chronic inflammation had not at all altered the functions of nutrition. A few days only before entering the hospital, the cough became much more frequent and more intense; the difficulty of breathing increased, and fever was ushered in. When we saw this patient for the first time, we thought him attacked merely with simple exasperation of the bronchitis. In fact, the expectoration indicated nothing else; it consisted of a clear, glairy mucus, marked by opaque streaks. Auscultation detected, in all the parts of the chest, a very loud mucous râle. The sonorousness of the thoracic parietes was every where equal; pulse was very frequent; skin hot. (Twenty leeches on each side of the chest.)

On the following day, the respiration seemed to be more free; pulse less frequent. But the following days the dyspnœa reappeared, and went on increasing. The chest, when percussed, ceased to sound beneath the right clavicle, and on the level of the inferior angle of the left scapula. Catarrhal expectorations still continued, mucous râle louder, orthopnœa, asphyxia and death. Blisters had been applied to the chest and lower extremities. Kermes and decoction of polygala had been given internally.

Post-mortem. Mixture of the red and grey hepatisation in the upper lobe of the right lung; red hepatisation of a small portion of the lower lobe of the left lung; general redness of the bronchi, which were filled with mucus.

This case affords an instance of what would have been formerly called *suffocating catarrh.* The cause of all the bad symptoms, and of death, lay in the inflammation of the pulmonary parenchyma; but the symptoms characteristic of this inflammation were here so little marked, that, without percussion, nothing would have been recognised during life but simple bronchitis. The expectoration remained catarrhal; the râle occasioned by the accumulation of mucus in the bronchi prevented us from detecting by auscultation the state of the pulmonary parenchyma. We might adduce here several other cases of chronic bronchitis, equally complicated with pneumonia, and announced by almost the same group of symptoms. The facts of this kind observed by us are sufficiently numerous to enable us to generalise the results, and to deduce from them the important conclusion, that in old persons affected with chronic bronchitis, the appearance of unusual dyspnœa, and of fever in them, very often recognises for the cause a greater or less inflammation of the pulmonary parenchyma. This inflammation, which in many cases is not announced either by the sputa, which continue catarrhal, nor by auscultation, as in the present case, nor even by percussion, when the inflammation is slight and of small extent; this inflammation, I say, may be very easily overlooked. Then one is inclined to consider the worst

symptom, namely, the dyspnœa, as resulting from the obstruction of the bronchi by the matter of expectoration, and the rational employment of bloodletting is neglected, or the use of it is even dreaded. Here, however, bloodletting, employed with that reserve which both the age and strength of the patient require, is as much indicated, and its beneficial results just as great, as in the most obvious and declared pneumonia.

Case 33.—Pulmonary tubercles—Intercurrent pneumonia.

A servant man, thirty-five years old, entered the La Charité, Aug. 7th, 1822. This man, who was of a delicate frame, had had frequent hemoptysis during the last eighteen months. Tormented with a constant cough, he had lost flesh and strength. At the time of his admission his sputa consisted of greenish, thick flocculi, suspended amidst a great quantity of serum. Auscultation detected a slight gurgling in the right supra-spinous fossa; elsewhere the inspiratory murmur was very clear; there was no pectoriloquy; the pulse, not frequent in the morning, was accelerated every evening, and every night the patient sweated a little in the neck and chest. The diagnosis formed was: softened tubercles in the summit of the right lung; crude tubercles scattered through the remainder of the lungs; healthy state of the pulmonary parenchyma around them. No perceptible change occurred up to August 27th. That day the breathing was more hurried than usual, and there was considerable fever. The patient complained of an acute pain beneath the left breast. (Eight leeches applied to the most painful point.)

On the next day, the 28th, the pain disappeared, but the dyspnœa was increased; streaks of blood were mingled with the sputa, which still retained the same character in other respects. Crepitous râle on the level of the inferior angle of the left scapula; intense fever. (Ten leeches to the left side.)

29th. Some crepitous râle is heard over all the left posterior part of the thorax; under the right clavicle, a mucous râle and gurgling. In other respects his state the same.

30th and 31st. The dyspnœa increased progressively; the same râles were still heard, and the same sonorousness of the chest. On the 1st of September the sputa were suppressed, and he died on the 2d.

Post-mortem. Three or four tuberculous cavities in the summit of the right lung, where during life the gurgling had been heard. Each of these cavities full of a purulent liquid, in the midst of which small portions of tuberculous matter floated, might contain at least a small nut.. In the rest of the upper lobe, and in the middle lobe of the right lung, there was found a number of crude tubercles, surrounded by healthy crepitating tissue. Numerous crude tubercles existed also in the left lung; the tissue of this lung contrasted with that of the right lung, by its red colour, the great quantity of bloody serum which flowed from it, and the ease with which it was torn. Bronchi red. Slight hypertrophy of the parietes of the left ventricle of the heart; ulcerations and tubercles in the intestines.

Here, again, the symptoms of pneumonia were very obscure. Auscultation alone revealed the existence of the inflammatory engorgement of the left lung. The sputa presented no other modification save the appearance of some bloody striæ, which certainly did not suffice to characterise a pneumonia. It is by no means uncommon to see phthisical patients die prematurely of intercurring pneumonias of this kind, which are too often overlooked, and the fatal termination of which might sometimes be prevented by bloodletting, employed more boldly than persons generally dare to do in phthisical patients. There is besides a fact, which we think that we have well ascertained; it is, that phthisical patients may be affected with pneumonia with more impunity than other persons.

Every time that in them the inflammation has not attacked too great an extent of the pulmonary parenchyma, its symptoms promptly disappear, and it is seldom fatal; but it has in general a mischievous influence on the increase of the tubercles, it hastens their development, and favours their increase. Very often also it passes to the chronic state; it then constitutes those indurations so frequently observed around cavities, and which are not always the result of an infiltration of tuberculous matter. The following case will afford an example of an acute softening of pulmonary tubercles after a pneumonia.

Case 34.—Pulmonary tubercles—Intercurring pneumonia giving rise to their acute softening.

A man, twenty-eight years of age, entered the La Charité in January, 1822. For the last three years he had had hemoptysis several times, frequent colds, a little habitual oppression; he had wasted considerably. Three days before entering the hospital he felt a stitch in the right side; the two following days the pain continued; there was great dyspnœa. When we saw him, he presented all the symptoms of pleuro-pneumonia in the first stage; breathing short and hurried; cough frequent, with expectoration of viscid transparent and reddened sputa; crepitous râle almost over all the right lung, sonorousness on this side a little less, fever, tongue white, and slight diarrhœa. (He was bled to twelve ounces; emollients.) Blood was coated.

On the fifth and sixth days, the same state. On the seventh day a return of the sputa to the catarrhal state; crepitous rale mingled in part with the natural respiratory murmur; breathing more free. On the following days the crepitous rale diminished, but did not cease altogether. The patient continued to cough, and his pulse retained a slight frequency. (A blister was applied to the right side.)

On the eighteenth day, in the midst of the sputa, which were those of simple bronchitis, there was observed a considerable number of small clots of a dull white. Were these fragments (*debris*) of tubercles? From this period the expectoration became purulent, hectic set in, and the patient fell into a state of marasmus with astonishing rapidity. On February 9th, twenty-eight days after the pneumonia had commenced, we heard a loud gurgling with doubtful pectoriloquy under the right clavicle, and in the hollow of the axilla of the same side. The patient died on the 23d, forty-two days after the invasion of the pneumonia, with all the symptoms of pulmonary phthisis in the third stage.

Post-mortem. — Immense tuberculous cavity in the summit of the right lung. Crude tubercles in great number in the remainder of this lung; much less numerous in the left lung.

There can be no doubt that the lungs of this individual already contained tubercles before the pneumonia; but these tubercles, as yet crude and not numerous, would perhaps not have become fatal till after a considerable lapse of time. In these circumstances, acute inflammation attacked one of the lungs; it was not severe, and soon yielded, but under its influence the tubercles previously existing in the inflamed lung soon became softened; others formed there, and the impulse once given to this morbid process, the patient ran through the three degrees of phthisis in less than six weeks. We may remark again, as an additional proof of our mode of viewing the matter, that in the left lung, which had not been inflamed, the tubercles were all found crude, and much less numerous, such as they probably existed in the right lung, before it was attacked with inflammation.

Case 35.—Pneumonia with hydrothorax of the opposite side, and aneurism of the heart.

A man, sixty years of age, who usually worked in the quarries, was attacked, in 1816, with pleuro-pneumonia of the right side. The two following years he

enjoyed good health. In 1819 his breathing began to be a little embarrassed; in 1820 his legs became œdematous; rest caused this partial infiltration quickly to disappear. From 1820 to 1822, pulmonary catarrhs were very frequent with him; an increase of dyspnœa. The patient entered the La Charité the 16th of September, 1822; the breathing was then short and hurried; speech a little panting; he coughed but little, and did not expectorate. The chest, when percussed, yielded a dull sound on the left posteriorly, from the inferior angle of the scapula to nearly the base of the thorax. In this same space there was evident œgophony and bronchial respiration; elsewhere the sound was clear, and the respiratory murmur loud and distinct. The heart was heard without impulsion, and with a bruit in the precordial region, at the lower part of the sternum, under the left clavicle; the pulse, remarkably small and intermittent, was free from frequency, and the skin was not hot. The diagnosis was, dilatation of the two ventricles; symptomatic hydrothorax. A bleeding to twelve ounces was prescribed. The blood presented no coat. On the following days respiration was more free; no other perceptible change up to the 27th. (Blister to the left side.)

On the night of the 26th, the patient raved. On the morning of the 27th, he was unusually talkative. The oppression again became considerable; the pulse always very small and intermitting, had acquired some frequency. (Sinapisms to the legs.)

On the 28th, the intellect again restored, but the pulse retained its frequency; the sputa were for the first time viscid and red. Some crepitous rale was heard posteriorly on the right in some parts; same state on the left. (Bleeding to eight ounces.) Blood coated.

On the 1st and 2d of October, the viscidity and red tint of the sputa still continued; breathing short and hurried. Still a crepitous rale, without dulness of sound, on the right; on the left, an increase of the dull sound; œgophony less perceptible; however, the delirium had become permanent, the patient was become exhausted, and the features altered; the pulse, which was very small, was scarcely frequent, and the skin was free from heat; tongue pale and dry; stools natural. (Decoction of polygala; sinapisms to the lower extremities.) Died on the 3d, in a state of half asphyxia.

Post-mortem. A pint and a half of serum perfectly liquid, without false membrane, without any trace of inflammation of the serous membrane, was effused into the left pleura. The lung of this side was compressed by the liquid, but was very healthy. Old cellular bands united the pleuræ costalis and pulmonalis of the right side. The right lung presented, both on its surface and in its centre, several red patches; in these parts the parenchyma, gorged with blood, was torn with the greatest ease and scarcely crepitated. These partial pneumonias, separated from each other, had attacked nearly one-fourth of the lung.

The cavities of the two ventricles of the heart were dilated, and their parietes slightly hypertrophied. A small ossification, two or three lines in length, and half a line in breadth, occupied one of the points of the adhering edge of the mitral valve. Another ossification of the same extent nearly was developed at the base of one of the aortic valves. The aorta was healthy, and had its natural calibre; the cavities of the heart were filled with large clots of black blood similar to currant jelly.

A considerable quantity of limpid serum infiltrated the sub-arachnoid cellular tissue of the convexity of the cerebral hemispheres. The lateral ventricles were distended by a somewhat turbid liquid.

When we examined this patient for the first time, it was easy to recognise in him the existence of an organic affection of the heart, and of an effusion into the left pleura. After a large bleeding, the dyspnœa diminished considerably;

then, after some days, in which matters remained stationary, the pulse, which till then was not frequent, became accelerated all at once, and the dyspnœa once more increased. The nature of the sputa announced with certainty the existence of a pneumonia; the crepitous rale indicated the seat of it on the side opposite that of the effusion. Here, again, the inflammation was in some measure scattered over several points, and really consisted of a crowd of partial pneumonias separated from each other by a very healthy tissue. At the same time that the inflammation of the pulmonary parenchyma manifested itself, the hydrothorax seemed to increase; such at least should be presumed from the diminution of the œgophony. At the same time also, some delirium appeared, the cause of which was found to be in an inflammation of the arachnoid. So many serious complications were quite sufficient to destroy the patient. The pneumonia, though slight, was here one of the principal causes of death. In fact, a considerable dyspnœa must result from a very slight pulmonary inflammation in an individual affected with an aneurism of the heart and a hydrothorax.

Case 36.—Pneumonia with pulmonary œdema and double pleuritic effusion—Intermittent fever at the commencement.

A man, about fifty-eight years of age, of a strong make, was seized the 8th of August, 1822, at eight o'clock in the morning, with a violent shivering, which, at the end of an hour, was followed by heat, then by a profuse sweat. On the 9th there was apyrexia. The 10th, a second attack similar to the first. On the 11th, apyrexia. The 12th, the patient entered the La Charité. We saw him at the beginning of the third accession; he felt icy cold in the trunk and extremities. However, the skin was burning hot; pulse hard and very frequent. At nine o'clock, the sensation of cold was succeeded by a sensation of burning heat, and sweating soon set in. Twelve grains of sulphate of quinine were prescribed for the next day, the 13th, to be taken in three doses at noon, at four o'clock, and at eight o'clock at night. On the morning of the 14th, the patient no longer felt any shivering, but merely a little heat, with some frequency of pulse. On the 15th, apyrexia.

On the 16th, the day of the fever, at ten in the morning, the patient felt a slight shivering, then he was seized with a burning heat over all the right side of the thorax, from the last ribs to the axilla. This pain, which was augmented by the slightest motion, did not cease till ten o'clock at night. In the night a profuse sweat took place.

In the morning there was great dyspnœa; speech short and panting; decubitus on the back. The pain of the preceding day had not reappeared, but the patient expectorated three or four viscid transparent sputa, of a greenish yellow colour. A well-marked crepitous rale was heard on the right, anteriorly and laterally. Posteriorly, on both sides, the respiration was very loud, sufficiently clear, mixed in some points only, and at intervals, with a crepitous rale; it was the same on the left anteriorly. Pulse frequent and hard; skin hot and dry; tongue whitish; diarrhœa. (He was bled to eight ounces.) The blood presented a large crassamentum without a coat. On the 18th, a loud crepitous rale was heard over all the parts of the chest; percussion elicited everywhere a clear sound, except low down on both sides, from the sixth or seventh rib. The pneumonic characters of the expectoration still continued. Pulse 110; forty-three respirations in a minute; the tongue was dry and pale. (Another bleeding to eight ounces; sinapisms to the legs.) A thick greenish coat on the surface of the crassamentum.

On the 19th, his state was the same. He died the next morning.

Post-mortem. On cutting into the tissue of the two lungs, an enormous

quantity of frothy colourless serum was seen to gush out from every part. The pulmonary parenchyma was everywhere of a greyish white colour, and crepitated perfectly, except near the root of the right lung. In this latter part, there was observed in separate patches a tissue of a livid colour, which did not crepitate and was very easily torn. These different inflamed portions combined would scarcely have equalled the size of an orange. On the left, from the level of the seventh or eighth rib to the diaphragm, the lung was separated from the thoracic parietes by a liquid of a deep red colour, the quantity of which scarcely equalled half a pint. Superiorly, false membranes of recent formation limited this effusion and united the lung to the ribs. On the right, there existed another effusion similar to the preceding, with respect to its being circumscribed, and also with respect to the quantity of the liquid, but which differed from it with respect to the qualities of the latter. It was a turbid serum, in the midst of which a considerable number of albuminous flocculi floated. A black coagulated blood filled the four cavities of the heart and distended the right auricle in particular.

When this patient entered the La Charité, he was affected with an intermittent fever exempt from all serious complication. The fourth fit was prevented by sulphate of quinine. Towards the time when the fifth should have returned, the shivering and pain of side marked the invasion of the pleuritis on the right side; the respiration soon became embarrassed; some crepitous rale was heard at first in some parts, then over almost all the thorax; finally, pneumonic sputa appeared. The general existence of the crepitous rale seemed to announce a general inflammatory engorgement of the two lungs; there was no such thing, however, and the autopsy proved that this rale depended on a pulmonary œdema. With respect to pneumonia, it also existed, but so circumscribed, that, without an attentive examination, it might have been easily overlooked, and the signs furnished by the expectoration might have been considered as deceitful. This pneumonia, confined to the root of one of the lungs, and occupying but a very small space, could have had but little share in the constantly increasing dyspnœa. Alone, it would probably have given rise only to the symptoms of acute bronchitis; but the serious symptoms, and the patient's death, are sufficiently accounted for, both by the double pleuritic effusion, and by the pulmonary œdema, which, in this case, evidently existed several days before the last struggle.

With respect to the appearance of the pleuritic pain at the time when the ague fit was to return, this case presents some analogy to those cited by M. Broussais, in his *Treatise on Chronic Inflammations*, and in which we see pleuritic and pneumonic affections commence during the shivering of an intermittent.

Case 37.—Pneumonia with pericarditis—Fibro-cartilaginous tumours around the heart.

A printer, twenty-four years of age, had been attacked at Rochelle ten months before entering the hospital with a quartan ague, which lasted for six months. Having arrived at Paris within the last four months, he never enjoyed good health here. He had from time to time attacks of fever, which never presented anything regular in their type: finally, since the last three months, he was subject to frequent diarrhœa. On the morning of the 9th of August, 1822, he felt below the right breast an acute pain, which was increased by coughing, by moving, or by deep inspirations. On the 10th this pain continued.

On the eleventh, the third day, we saw the patient for the first time. The pain had not diminished, the respiration was impeded, the patient coughed frequently, and commenced since the last three hours to expectorate some viscid and red sputa. Anteriorly on the two sides, the respiration was heard loud and clear;

laterally on the right side, and posteriorly below the spine of the scapula there was some crepitous rale; every where else the respiration was weak, but clear; in no part was the sound dull. The pulse was full and very frequent, the skin hot, tongue white, mouth foul; two or three liquid stools had taken place within the last twenty-four hours. The patient had sweated much on the evenings of the ninth and tenth; he was very weak, and sat up with considerable difficulty. The spleen was felt below the edge of the ribs, and descended nearly to the umbilicus; the liver also was felt in the right hypochondrium, to the extent of two or three fingers' breadth below the ribs. The existence of a pleuro-pneumonia was evident; the absence of the dull sound, the signs furnished by auscultation, the nature of the sputa, which could be detached from the vessel, announced that the lung was as yet but engorged. (Bleeding to twelve ounces; emollient ptisans.)

No improvement took place after the bleeding. In the course of the day the stitch in the side increased. In the evening and all the night there was a copious sweat.

On the morning of the fourth day, the pain was very acute: the patient had expectorated but three or four transparent red and very viscid sputa. He coughed but little; there was great oppression. Auscultation detected on the right, in the same points as on the preceding day, a weaker crepitous rale without the respiratory murmur; laterally on the same side the sound was a little dull; on the left, laterally and inferiorly, some crepitous rale was also heard in different points. Decubitus on the back. The pulse, which was very frequent, was harder, and the skin was burning hot. Thus the inflammation, far from yielding, had increased on the right side, and had also extended to the left lung. This double inflammation admitted of a very unfavourable prognosis. (He was bled to sixteen ounces.) There was great oppression all the day. In the evening and the night, the perspiration was less than on the other days.

On the fifth day the pain was more acute than ever. The patient ventured neither to cough, nor breathe, nor make the slightest movement, for fear of exasperating it; this pain rendered percussion impracticable. The crepitous rale existed in the same parts as on the day before, and still more, it was now heard for the first time on the right, anteriorly from the clavicle to the breast; the expectoration was merely that of simple catarrh. The crassamentum of the blood drawn on the preceding day, small and surrounded with much serum, was covered with a very thin coat; the blood of the first bleeding presented none. (Thirty leeches to the right side; emollient drinks and lavements.)

The pain of the side diminished during the application of the leeches; the next morning it was felt only during the cough; in other respects the same state. (Blister to the right side.) A little time after we had quit the patient, a very profuse sweat took place. It continued for the day and all the night.

On the morning of the seventh day, his skin was still moist; the respiration was evidently more calm, speech more free, the crepitous rale was mixed on both sides with the natural respiratory murmur; the sputa, now thick, resembled those of chronic bronchitis; frequency of pulse had not diminished.

However, at the same time that the symptoms of pneumonia amended, new phenomena were threatening to appear; the patient's intellects became disturbed; the expression of his eyes bespoke delirium; thirty leeches were applied along the jugulars, and the intellect was soon restored.

From the eighth to the twelfth day the state of the patient improved. The crepitous rale was gradually succeeded by the natural respiratory murmur; but it was not entirely gone. The dull sound disappeared; at the same time the strength became restored with incredible rapidity; profuse sweats took place

every night; there was but little cough, which was accompanied with very thick sputa; the pulse retained moderate frequency.

On the twelfth day, the abdomen and chest were covered with a number of small miliary, transparent, conical vesicles, surmounting a very small red patch. On the thirteenth and fourteenth days, this eruption continued. On the fifteenth it was succeeded by a desquamation of the cuticle. A little crepitous rale was still heard in different points of the chest on both sides.

On the evening of the fifteenth day, he was suddenly seized with an excruciating pain in the lower part of the sternum; his chest seemed to him as if screwed in a vice. He passed the night in a state of extreme anxiety.

On the morning of the sixteenth, this pain and sensation of squeezing still continued. The oppression had reappeared worse than ever. The breathing was short and unequal, the speech panting. The pulse again became very frequent; it was very compressible. The features were visibly altered; however, the cough had not increased; the expectoration remained catarrhal; the respiratory murmur was heard as well as on the preceding days; it was even louder. Nothing unusual in the pulsations of the heart. An attack of pericarditis was suspected. (He was bled to twelve ounces.) The blood was thickly coated.

The following day, the seventh of the pneumonia, and third of the pericarditis, the feeling of squeezing in the chest no longer existed; the pain had left the sternum, and was now seated in the precordial region; it was increased by lying on the left side. The breathing was more free, general anxiety less; pulse not so frequent.

On the following days, the pericarditis went on assuming a chronic course; the pain was very obtuse; the patient felt no oppression except when he attempted to move; the frequency of the pulse was moderate; sweating took place every night. The sound soon became very dull on the anterior left part of the thorax, from the base of the sternum to a little above the breast; the strength, which was so rapidly re-established, again sunk; countenance puffed, and very pale; the respiratory murmur continued to be obscured by a little crepitous rale in several parts. In this state the patient wished to leave the hospital; he again entered it at the end of three days, and died two or three hours after. Up to his death he still had the purging, and a dislike for food. Tongue was constantly white; he never vomited.

Post-mortem. The lungs, which were gorged with blood, were in every part pervious to the air. In several parts, particularly at the posterior part of the upper lobe of the right lung, and towards the middle part of the left, their tissue was torn with great ease.

About half a pint of turbid serum, then of white, thick pus, escaped from the cavity of the pericardium; this membranous sac, which was prodigiously distended, pushed back to the lungs, and the heart occupied but a very small portion of its cavity. The free surface of the serous membrane of the pericardium was uniformly covered by a white false membrane, two or three lines in thickness, presenting a great number of small asperities like those found in the paunch of ruminant animals; beneath this false membrane the serous membrane had retained its natural appearance. In three points of its extent the portion of serous membrane covering the heart was separated from it by a tumour, the size of a nut, presenting all the characters of a fibro-cartilaginous tissue; each of these tumours had pushed the serous membrane before it, and formed a projection on the interior of the pericardium. The heart contained but a small quantity of black half coagulated blood; its internal surface was intensely red; this redness was also observed in the aorta, empty of blood as far as the middle of its abdominal portion; there it diminished, and then was observed only in patches, then disappeared entirely, a little before the bifurcation of the artery.

The liver passed the edge of the ribs by three fingers' breadth; its tissue was a bright red, and very dense. The spleen, which was very large, and also very dense, advanced nearly to the umbilicus. The stomach was remarkably capacious; its inner surface presented, along the great cul-de-sac, a brownish colour, which continued to diminish towards the pylorus; not far from this orifice it acquired a whitish somewhat rose coloured tint; in every part where the brown colour was found, the softened mucous membrane was removed in a pulp by the least scraping. The small intestine presented at its upper part a tint similar to that of the pyloric portion; lower down it was pale. The large intestine presented here and there a little injection; the inner surface of the colon was, moreover, traversed by a considerable number of black points, situated in the centre of a slight elevation of the mucous membrane, with a black circle around this elevation.

A little limpid serum infiltrated the subarachnoid cellular tissue of the convexity of the cerebral hemispheres; the lateral ventricles contained a considerable quantity of it.

One of the most important facts which should be remarked in this case, is the state of the lung at a time when, without auscultation, which detected a little crepitous rale in some points, one would have thought that the pneumonia was completely resolved; the pulmonary parenchyma was far, however, from having returned to its natural state. The case proves how slowly the complete resolution of pulmonary inflammations is effected, and what great precaution is necessary in convalescence, either to avoid relapses, easier in this than in any other disease, or to prevent, in persons predisposed to them, the formation of tubercles in the portions of the pulmonary tissue which remain engorged and inflamed a long time after all the rational signs of pneumonia have disappeared.

The commencement, course, and progress of the pulmonary inflammation, and subsequently its resolution, were here announced by means of auscultation with great precision. This pneumonia was more formidable for its extent than for its intensity in each point where it existed. In no part, in fact, did it seem to have passed scarcely the first stage. Hence the reason why, after having manifested itself by the most severe symptoms, it was afterwards resolved with considerable ease and rapidity. Two bleedings were employed without the inflammation seeming to amend. The pleuritic pain became more and more intense, notwithstanding these two bleedings; it gave way after the side had been covered with leeches. The resolution began from the sixth to the seventh day. Was it promoted by the blister then applied to the chest? Was it not rather the result of the very profuse sweats which took place at this period?

We should not forget to notice the transient symptoms of cerebral irritation which appeared at the same time that the inflammation of the chest was amended. Let us also recollect the miliary eruption which appeared at a subsequent period, and which the ancients would have reckoned among the number of critical phenomena. We may also observe with what astonishing promptitude the strength was re-established from the moment the intensity of the inflammation ceased to call it to a single organ.

The resolution of the pneumonia seemed almost complete, when the pericardium was attacked with inflammation. We have seen what phenomena marked the outset of this new disease. A bleeding did not remove it, but it moderated the symptoms, and caused it to pass to the chronic state. The dulness of sound announced at the end of some days the formation of an effusion into the pericardium. With respect to the fibro-cartilaginous tumours developed between the heart and serous membrane, there is no doubt but they existed previously to the

pericarditis; but not interfering much with the functions of the heart, they had not been indicated by any symptom.

We may notice here the species of hypertrophy of the liver and spleen in a person who had a long time been labouring under quartan ague.

Case 38.—Pneumonia with hepatitis.

A stone-cutter, fifty-one years of age, entered the hospital in such a state of debility, that no precise information could be obtained with respect to the previous history of the case. All that was known of him was, that for the last ten or twelve days he had been attacked with fever, cough, and dyspnœa; that for the last four days his skin had become yellow. On July 23d, his state was as follows: — breathing short, hurried, performed simultaneously by elevation of the ribs and depression of the diaphragm; speech panting; decubitus on the back, frequent cough; transparent, very viscid sputa, as green as the resinous matter of the bile. The chest, when percussed, yielded a very dull sound on the right, anteriorly from the clavicle to a little below the breast, and posteriorly from the spine of the scapula to a little above the inferior angle of this bone. In this same extent, anteriorly, no species of respiration or of rale was heard; posteriorly, there was a slight crepitous rale, without any admixture of the pulmonary respiration. Lower down, the respiration was heard loud and clear, as well as over all the left side; pulse frequent and small, skin hot and dry. Tongue covered with a green coating; the right hypochondrium, full and painful, presented greater resistance on pressure than the left. Alvine evacuations natural with respect to quantity and quality. Urine scanty, and causes pain when being passed, and is of a well-marked orange red. The face, trunk, and inside of the upper extremities, were of a yellow colour, bordering on green.

The signs afforded by auscultation and percussion announced hepatisation of the upper lobe of the right lung: however, the sputa were scarcely viscid; their colour, which was of a deep green, was totally different from the red, yellowish, or greenish tint usually observed in pneumonia. The painful tension of the right hypochondrium, united to the jaundice, caused us to suspect the coexistence of hepatitis. The great dyspnœa, alteration of the features, even the seat of the pulmonary inflammation, being more dangerous when it exists in the upper lobes, the advanced stage of this inflammation, in fine, the supposed complication of hepatitis, rendered the prognosis most unfavourable. (Bleeding to twelve ounces, emollient drinks and lavements.) The blood presented a large clot, covered with a dense, thick, deep yellow coat. A bit of paper dipped in the serum received from it a yellow tinge. In the evening the dyspnœa was extreme; in the night the patient raved. On the morning of the 24th, the inspirations were short and very frequent. On the right, laterally and anteriorly, for the space of three or four fingers' breadth below the breast, where twenty-four hours before the respiratory murmur was perfectly distinct, we heard some crepitous rale; thus the inflammation had extended. The sputa retained the same character. Pulse beyond counting; jaundice had become general. (Blister to the right side of the chest.)

Post-mortem. The entire surface of the skin of a well-marked greenish yellow tint. Cartilages of the ribs yellow.

The upper lobe of the right lung presented a yellowish grey colour all through its entire extent. From its tissue, which was easily torn, and which was reduced to a pulp by pressure, a great quantity of purulent liquid flowed, which was also of a slight yellow tint. The tissue of this same lobe, when freed by washing from the pus which infiltrated it, presented a great crowd of reddish granulations pressed close together. The greater portion of the middle lobe presented

a mixture of red hepatisation and of simple engorgement. Every where else the pulmonary parenchyma was healthy; the right bronchial mucous membrane much more red than the left. A yellowish polypus-like concretion ramifying through the pulmonary artery and venæ cavæ, distended the right cavities of the heart.

The liver passed the breadth of two fingers below the cartilaginous edge of the false ribs. It had a colour like the lees of wine; its tissue, which was remarkably soft, was reduced by slight pressure to a reddish pulp. The gall-bladder contained but a small quantity of bile, of a deep yellow colour; the biliary ducts were free; slight pressure made the bile flow into the duodenum. This last intestine presented not the slightest injection. The inner surface of the stomach was through all its extent a white rose colour. The rest of the intestinal canal was white; spleen very soft.

Dura mater coloured yellow; subarachnoid cellular tissue infiltrated with serum equally yellow; lateral ventricles filled with a similar liquid.

The sputa did not here announce the degree of the pulmonary inflammation. They were scarcely viscid, and their green colour seemed to depend on the mixture of bile and bronchial mucus; what proves it, is, that this same colour was found on the upper surface of the tongue. *The nature of the expectoration was then occasioned, in this case, by the disease of the liver.*

The real bilious sputa are very rare, and we shall hereafter endeavour to prove that the sputa which ordinarily receive that name, are nothing but sputa tinged with a greater or less quantity of blood.

We shall not dwell on other circumstances of this case, important with respect to hepatitis, such as the signs announcing this inflammation, the particular alteration which the liver presented, the perfectly healthy state of the duodenum, though the liver was diseased, &c.

Case 39.—Pneumonia with general inflammation of the gastro-pulmonary mucous membrane.

A cabinet-maker, thirty-eight years of age, entered the La Charité, April 23d, 1822. He had for several days back a severe diarrhœa; he coughed, and was hoarse; on the 24th he presented the following state:—

General debility, which was now become extreme; intellect dull; eyes red and watery; coryza; tongue red; deglutition painful; abdomen free from pain; diarrhœa; hoarseness; respiration a little hurried; expectoration catarrhal; frequent cough; the patient feels not the least oppression; he neither feels nor at any time felt pain in the chest; pulse frequent and hard; skin hot and dry.

There was evidently here general inflammation, but not very severe, of the intestinal and pulmonary mucous membrane. Nothing indicated that the pulmonary parenchyma itself was attacked. One would have said that the individual was on the eve of scarlatina, or measles. (A bleeding to eight ounces; the patient took in the course of the day twelve grains of Dover's powder in two separate doses.) By the use of this diaphoretic we endeavoured to assist the development of the eruption, if any was to come. In all cases, after having moderated the internal inflammation by a bleeding, it was sought to weaken it, by determining a fluxion towards the skin.

The day after, the 25th, same state; no sweats. (Twelve leeches to the anus.) On the night following, delirium. 26th. Air of stupor, prostration greater, tongue red and pastry, great thirst, abdomen soft, three or four stools, voice entirely gone; cough more frequent, breathing more hurried, viscid and red sputa; sound dull on the posterior and lateral part of the right side of the chest, over nearly all the middle and lower lobe of the lung of this side. Over

the same part there was bronchial respiration, pecular resonance of the voice. (Thirty leeches to the epigastrium; two blisters to the legs.)

In the evening he became delirious; when asked if he felt pain in any part, he pointed to the sternal region. He died in the night.

Post-mortem. The parenchyma of the middle and lower lobes of the right lung was dense, and impervious to air; the lower lobe was in a state of grey hepatisation, the middle in that of red. An albuminous, membraniform concretion, of recent formation, was interposed between these two lobes. Some thready mucus, placed between the lips of the glottis, appeared to obstruct this opening. The mucous membrane of the larynx and trachea presented a considerable number of patches and reddish bands. A livid red colour prevailed through all the extent of the bronchi. The heart was of the ordinary size, but there was perceptible hypertrophy of the parietes of the left ventricle, with narrowing of its cavity. The right cavities, distended by liquid black blood, contained some white fibrinous clots, closely adhering to the carneæ columnæ.

The posterior wall of the pharynx was intensely red. The œsophagus was white. The stomach was somewhat distended with gas and liquids. The inner surface was divided into two portions, very distinct with respect to their colour. All the splenic portion presented a bright red tint, which was seated in the softened mucous membrane: the pyloric portion was white, without softening. Large veins filled with blood passed beneath the mucous membrane. This membrane was, as it were, lined by a considerable quantity of liquid brown blood, which it seemed to have exhaled. The three upper fourths of the small intestine presented a red colour, which in several places depended on a submucous injection, but which, in a considerable number of points, depended also on the injection of the mucous membrane itself. In two or three places, where the mucous membrane appeared to be more intensely inflamed, it was covered by a bloody liquid similar to that of the stomach. The lower fourth was white to about one foot above the cæcum. In this latter part there was observed a slight redness of the mucous membrane; there also appeared two pimples (*élevures*), each the breadth of a twenty sous piece, projecting two or three lines above the rest of the inner surface of the intestine. Their edges were formed by mucous membrane of a livid red colour. Their surface presented a brownish grey layer firmly adhering to the subjacent parts, which seemed to constitute a real eschar of the mucous membrane; beneath it the tissue was considerably thickened, and of a brownish red colour. There was a close resemblance with respect to form and colour between these tumours and anthrax of the skin. The large intestine was healthy. The spleen, which was large, was very easily torn into a sort of bouillie of a deep black colour.

The meninges covering the convexity of the cerebral hemispheres were injected; the cerebral substance, which was firm, presented, when cut into, a considerable number of red points; the ventricles contained but some drops of serum.

The *post-mortem* exhibited in this patient a general inflammation of the gastro-pulmonary mucous membrane, as we had recognised from the first day; but it also disclosed to us a serious alteration of the pulmonary parenchyma, which we recognised only twenty-four hours before death, and which, beyond all doubt, must have existed for several days back. Up to the time preceding the last twenty-four hours of the patient's life, there were so few symptoms of pneumonia, that we considered percussion and auscultation unnecessary; a striking instance of latent inflammation of the lung with suppuration of its tissue! It is only by the very rapid progress of the pneumonia, from the 25th to the 26th, that it can be accounted for, why the dyspnœa, which up to that period was almost none, became all at once so severe. The appearance of the pneumonic

sputa on the last day only, is also a very remarkable circumstance. I would be disposed to believe that the state of purulent infiltration of the lower lobe contributed nothing to the production of these new symptoms, and that they were rather the result of a new inflammation which took possession of the middle lobe, and which was sufficiently acute to produce very rapidly the red hepatisation of this lobe. Thence, also, the increasing exhaustion and death.

Case 40.—Double pneumonia, enteritis, and peritonitis of an acute form.

A smith, twenty-one years of age, had a profuse dirrrhœa for the last twelve days, when he entered the La Charité, the 31st of December, 1821. The symptoms on the 1st of January were — headach; face flushed; tongue whitish; anorexia; abdomen free from pain; several liquid stools; pulse frequent and full; heat of skin. (He was bled to twelve ounces.) Blood not coated. From the 2d to the 5th of January, there was a gradual disappearance of the fever, diarrhœa, and other morbid symptoms. On the 5th, convalescence. On the 6th, everything changed its appearance: pulse again very frequent; breathing high and hurried; auscultation detected some crepitous rale posteriorly on the two sides. Was this the invasion of a double pneumonia? (Twenty-four leeches to the anus.

7th. Abdomen covered with a number of small pimples scarcely the size of a pin's head, white, semi-transparent, more sensible to touch than to sight (sudamina). Thirty leeches more applied to the anus.

8th. Countenance expressive of anxiety and pain. The patient, who lies on his back, dreaded the least motion for fear of increasing the acute abdominal pains which he felt for some hours: slight pressure was necessary to increase these pains. Tongue moist and red; belly tense; no stool had taken place. The respiration, which was short and very much hurried, was performed particularly by the elevation of the ribs; the crepitous rale continued posteriorly on both sides; pulse wiry, small, and moderately frequent; profuse sweat all the night; considerable eruption over the abdomen, chest, and extremities. (Thirty leeches to the anus; fomentations and embrocations, with oil of chamomile to the abdomen; emollient drinks and lavements.)

9th. Same state. 10th. The same character of the respiration; auscultation and percussion impossible posteriorly, by reason of the extreme difficulty of moving; abdomen tense and painful; colon distended with gas. (Thirty leeches over the abdomen; lavements of castor oil.)

11th. Dyspnœa increasing; pulse very small and irregular; features very much altered. (Blisters to the thighs.) He died in the evening.

Post-mortem. Posterior part of both lungs did not crepitate; from their tissue, which was easily torn, and similar to the tissue of the spleen, there flowed a considerable quantity of bloody serum.

The peritoneal cavity was filled with a liquid of a dirty grey colour, in the midst of which some albuminous flocculi floated; membraniform concretions, still soft and recent, observable among the intestines.

The inner surface of the stomach white, as well as that of the upper four-fifths of the small intestine. The inner surface of the lower fifth was marked with a great number of small round pimples, white or reddish, being, on an average, about the size of a grain of millet, projecting a little above the level of the mucous membrane, at the expense of which they were formed; between these pimples the membrane was white. In this same portion of intestine there was observed a red oval patch, projecting about a line above the rest of the mucous membrane, having its greater diameter in the direction of the course of the intestine, presenting in this same direction two or three inches in extent and about

one inch and a half in breadth ; its surface was, as it were, wrinkled and uneven ; it consisted solely of mucous membrane partially inflamed. Finally, in the part about three or four fingers' breadth above the cæcum, there were observed numerous ulcerations, the base of which was formed by the laminated tissue, which was red and a little thickened, and the edges by the mucous membrane irregularly cut, and presenting a blackish colour to the extent of about a line around the ulcer. This was found only in the cæcum, which was white, as well as the remainder of the large intestine.

When the patient entered the hospital, he had but one of those slight attacks of enteritis, which are soon removed in a few days by mild treatment. Accordingly, the diarrhœa soon ceased, the fever was moderated, and everything seemed to announce convalescence, when all at once the pulse once more became frequent, the respiration hurried, and some crepitous rale was heard in the posterior portion of the two lungs. A little time after, the peritoneum was attacked with inflammation ; the symptoms of pneumonia then became very obscure ; there was no characteristic expectoration ; the cough was very slight, the dyspnœa might be very naturally considered as the mechanical result of the pressure on the diaphragm, owing at once both to the peritoneal effusion, and to the gaseous distension of the colon : the simultaneous existence of inflammation in the two lungs, diminishing the sound equally on both sides, rendered the signs afforded by percussion rather uncertain. There remained then but auscultation, but in consequence of the acute peritoneal pain, caused by every change of position, auscultation itself could be but very imperfectly employed. Here then is a case where everything seemed to concur in obscuring the diagnosis of the pneumonia, and where, in fact, we would only suspect its existence : these are the cases so frequently met in the practice of medicine, and which serve to increase its difficulties so much.

The state presented here by the portions of inflamed lung we think should be looked on as intermediate between simple engorgement and red hepatisation : in an anatomical point of view, this state seems to constitute the transition from the first to the second stage of pneumonia.

Case 41.—Pneumonia at the onset of small-pox, disappearing according as the eruption was established.

A man, twenty-two years of age, felt on the 23d of September, 1822, dizziness, and an acute pain in the lumbar region : he vomited. On the twenty-fourth, frequent cough and dyspnœa. Having entered the La Charité in the evening, he was bled. The crassamentum was covered with a thin coat. On the morning of the twenty-fifth, the respiration was high and hurried ; sputa viscid, red, and transparent ; the chest, when percussed, sounded in general rather badly ; the natural respiratory murmur was masked in a number of points by some crepitous rale. Pulse frequent and full, skin hot, tongue moist and whitish, stools natural, face flushed, dizziness continues. We considered this patient as affected with double pneumonia, which as yet was not severe. (Bleeding to twelve ounces ; sinapisms in the evening.) The bleeding presented a thicker coat than the first.

Twenty-sixth (third day), difficulty of breathing increased, crepitous rale louder and more general. Countenance, which was constantly flushed, presented an air of remarkable anxiety : there was much fever. Thus, since the last twenty-four hours, the pneumonia sensibly increased ; and, however little it may have increased, there was some reason to dread lest it should prove rapidly fatal in consequence of its extent. (He was bled to eight ounces ; two blisters to the legs.)

On the morning of the twenty-seventh, same state. In the evening a simul-

taneous eruption on the face, chest, and arms, of very small, red and conical pimples ; these were larger and more numerous on the next morning. Since their appearance the breathing had become more free, the sputa passed again to the catarrhal state. The natural respiratory murmur almost every where succeeded the crepitous rale : chest more sonorous. On the following days, the variolous eruption came out regularly and the symptoms of pneumonia disappeared.

The group of symptoms which marked the onset of this disease announced an inflammatory fever ; but the signs of a local inflammation soon appeared, namely, of pneumonia. The latter seemed more serious for its extent than its intensity, in each of the points which it occupied. Several bleedings did not arrest its progress. A fatal prognosis was already forming, when the symptoms of this inflammation disappeared, as if by enchantment, at the same time that the variolous eruption began to develope itself. This eruption was here really critical. Such facts are any thing but rare. Who knows not that the onset of the exanthematous fevers is oftentimes marked by signs of arachnitis, of pneumonia, of gastritis, &c., which cease with astonishing rapidity the moment the eruption begins to appear ?

Pneumonia often appears during the course of small-pox, and it is beyond doubt one of its most dangerous complications. But sometimes it is announced by characteristic symptoms, and then it may be combated with success by an antiphlogistic treatment more or less active. Sometimes, being more dangerous, it is completely latent; it then has often disorganised the pulmonary tissue, before its existence is even perceived. In the majority of cases, it prevents the free development of the cutaneous eruption, and is one of the frequent causes of those irregular cases of small-pox, usually fatal, designated by the ancients malignant small-pox. Hence the importance of the precept frequently to percuss and auscultate the chest of variolous patients, even when their breathing seems completely free. Every time, also, that this double method detects the existence of a pulmonary inflammation, we should not hesitate to have recourse boldly and copiously to bloodletting, the only means of moderating the internal inflammation, and thereby favouring the eruption.

CHAPTER IV.

TERMINATION OF PLEURO-PNEUMONIA BY GANGRENE.

Case 42. — An organ-player, twenty-eight years of age, drank, on the 25th of August, 1822, a great quantity of very cold water, whilst he was in a perspiration. The latter was suppressed ; a few hours after he was seized with a shivering, and the same evening he felt below the right breast an acute pain, which became more severe during the night. At the same time there was oppression, and a dry cough ; a continuance of these symptoms on the 26th and 27th. On the 28th, the fourth day, he was bled ; diminution of the pain, appearance of bloody sputa. On the fifth day, a second bleeding. On the sixth, seventh, and eighth days, a continuance of the red sputa, frequent cough, oppression and fever. The nine days following, the same state. The patient contented himself with keeping his bed, and observing strict diet. Such was the account he gave us. He entered the hospital on the 9th of September, sixteen days after the attack of the pneumonia. The next morning he presented the following state : —

The countenance was pale, the debility and emaciation were carried to a high degree ; one would have taken him for a person exhausted by a suppuration of

long standing. There no longer existed any trace of the stitch in the side. The patient complained of difficulty of breathing; he lay on his back, a little inclined to the right side; he coughed frequently, and expectorated a liquid of a brownish red colour, similar to the *prune-juice sputa* of the third stage of pneumonia. No sound from the chest, when percussed, posteriorly and laterally; over this same extent neither respiration nor rale was heard. Pulse frequent, without heat of skin. Diagnosis; pneumonia in the third stage. (Large blister to the right side of the chest; kermes; twelve grains of Dover's powder in four packets.)

On the 18th and 19th days, profuse sweats, probably caused by the Dover's powder. On the 20th day, the Dover's powder was suppressed; no sweat; catarrhal expectoration. On the evening of the 21st day, the sputa expectorated during the night seemed to exhale a somewhat fetid odour. In the course of the day there was a perceptible change in the expectoration. It consisted of a liquid of a dirty greenish grey colour, repulsively fetid. On the next morning the dulness on the right side was lessened, and where, on the preceding day, the respiration was none, we now heard a well-marked gurgling. From this it was to be supposed either that a purulent effusion formed in the pleura had emptied itself through the bronchi, or else, what was more probable, that a communication was established between one of these tubes, and an ulcerating cavity, in consequence of gangrene of the lung.

On the following days, the increase in the fetor of the sputa, their colour, which was now more and more characteristic, seemed to us to announce, in a manner not to be questioned, gangrene of the lung. (Decoction of polygala, Morton's pills, syrup of balsam of tolu.) From this moment the patient wasted away with frightful rapidity; the countenance assumed a cadaveric aspect; an infectious atmosphere existed around him; he constantly lay on his back, with a slight inclination to the right side. The moment he raised himself a little, the sputa flowed into the trachea in such abundance, that imminent suffocation was the result. — Continual sweats, which we in vain attempted to check, at first by preparations of quinquina, then by acetate of lead, proved to the unfortunate man an additional source of exhaustion. Dating from the 26th of September (33d day), profuse diarrhœa set in, which continued till the 5th of October, when he died.

Post-mortem. In the inferior lobe of the right lung, was found an immense cavity, with wrinkled, brownish parietes, whence an infectious, gangrenous odour was exhaled. A pultaceous, semifluid mass, of a dirty greenish grey colour, filled it: large bronchial tubes opened into it; it was separated from the ribs only by a very thin portion of pulmonary tissue. Around this cavity, which might admit an orange, the parenchyma of the lower and middle lobes presented a mixture of the red and grey hepatisation. The posterior part of the upper lobe of the left lung presented a red colour, which contrasted with the pale tint of the remainder of this lung, whose tissue was readily torn, and scarcely pervious to the air. (Transition from engorgement to red hepatisation.) The stomach and the remainder of the digestive tube were very pale.

This case differs from most of the cases of gangrene of the lung hitherto published, in the gangrene having here evidently succeeded a pulmonary inflammation. It is a real instance of pneumonia terminating in gangrene. The nature of the symptoms, as well as the state of the lung around the ulcer, equally prove it. The period when the portion of the inflamed lung commenced to become gangrenous, cannot be accurately determined; but we were apprised by the nature of the expectoration, of the moment when a communication was established between the bronchi and gangrened part. When the patient died, there was already complete separation of the eschar, and a formation of an ulcerating cavity around it. Observation has not yet demonstrated, whether after the com-

plete separation and discharge of the dead parts, the parietes of the ulcer might not be approximated, cicatrisation take place, and the patient recover.

Death was really hastened in our patient by the inflammation of the left lung, which was recent, and on which depended, no doubt, the bloody striæ which appeared in the sputa a little time before death. We may here remark the white colour of the intestinal mucous membrane in an individual affected with profuse diarrhœa.

Case 43. — A man, twenty-one years old, felt, eighteen months before, a pain below the left breast; at the same time some oppression, cough with bloody sputa. He was bled, and a blister was applied to the left side of the chest. Since that time the breathing remained short, and the cough continued. Still the patient remained at his usual laborious occupation. Three weeks only before entering the La Charité, he had rather a profuse hemoptysis, and from that period he gave over work.' On 3d of July, 1824, he presented the following state: —

Sound dull over all the left side of the chest, both anteriorly and posteriorly. A little below the level of the inferior angle of the scapula, there was heard a mucous rale, which resembled very closely a cavernous gurgling; in this same part the bronchial respiration was heard at intervals, and a very loud resonance of the voice. Elsewhere, on this same side, nothing else was heard but different varieties of the bronchial rale. On the right, the sonorousness of the parietes was still preserved, respiratory murmur was loud and clear, except in some points, where a little of the bronchial rale was heard. Speech free; breathing not perceptibly embarrassed; breath fetid; sputa very profuse, consisting of a purulent liquid, of a greenish white, flowing in a stream, and emitting a very disagreeable odour — lies on his back; can lie equally well on the right and left; pulse of moderate frequency, without heat of skin. In the evening a sensation of burning heat all over him, not ushered in by shivering; sweat at night. No appreciable disturbance in the digestive functions. Considerable strength still remaining; great emaciation of all the body, except of the face. (Morton's balsamic pills, syrup of tolu, compound hydromel.)

On the morning of the 5th of July, the pulse was more frequent, and the temperature of the skin raised. (Bleeding to eight ounces.)

No perceptible change took place up to the 22d of July. Towards this period the character of the sputa became changed. With the purulent liquid already described, there began to be mixed another matter consisting of a number of small greyish clots, exhaling a very fetid odour. The following days, these greyish sputa, at first scanty, became more and more copious and fetid; on approaching the patient's bed, an infectious and gangrenous odour was perceived, which arose both from his sputa and his breath. Since the expectoration presented these new characters, the pulse was habitually small and frequent; countenance remarkably pale; every morning we found the patient lying on the left side. Three or four times he vomited his food. In other respects, the breathing was not more embarrassed; his strength was still retained, and emaciation did not increase. Though the prognosis was very unfavourable, the fatal termination still seemed very distant.

On the 9th of August, the patient arose from bed as usual, went into the hospital garden, and remained there for two hours. The remainder of the day he seemed to be in the same state as on the preceding days. In the evening, when walking in the wards, he found himself ill, and returned to bed, supported by two persons. At within a few minutes of ten o'clock, he was heard to converse freely and with a strong voice; only it was remarked that his face was more altered than usual. At ten o'clock he died.

Post-mortem. Marasmus of all the body, except the face. Cadaveric

rigidity. Intimate adhesions of the pleuræ costalis and pulmonalis of the left side. All the lung of this same side hard and impervious to air; its tissue, when pressed between the fingers, resists and does not crumble; no liquid escapes from it, either by incision or pressure. Its colour, differing but little from that observed in the healthy lung, was of a greyish red; when cut in different directions, it seemed traversed by an immense number of yellowish granulations of great minuteness. Were these granulations occasioned by the distension of the pulmonary vesicles with concrete pus? Were they nascent tubercles? This same lung on its surface and in its interior presented a vast number of lines of a dull white colour, which crossed each other so as exactly to circumscribe the pulmonary lobules, the limits of which were thus perfectly marked out. These lines seemed to be formed of cellular tissue, thickened, and as it were fibrous, which, in the natural state, separates the lobules from each other.

Nearly towards the middle part of the summit of this lung, not far from its external surface, there was found a cavity large enough to admit a good-sized nut. A gangrenous odour exhaled from it: its parietes were lined with a thin layer of greenish matter, which exhibited the pulmonary tissue beneath it red and hard. Several bronchi of considerable calibre opened into this cavity, which was empty. The internal surface of the bronchi was red, the parietes of several of them presented an evident hypertrophy: in some parts they became so very much dilated as to represent small cavities. It was particularly towards the centre of the lower lung that these partial dilatations were observed; they contained a greyish, fetid matter, similar to sputa.

The right lung was healthy, except near its base, where it presented a portion in the state of red hepatisation, nearly equalling the size of an orange, the great friability of which indicated its recent formation.

In this patient, as in the subject of the preceding case, the gangrene of the lung manifestly succeeded an inflammatory state of this organ. The nature of the morbid phenomena, and the state in which the lung was found around the ulcer, equally prove it. In the first patient the gangrene succeeded to acute pneumonia; in the second to one of the most manifestly chronic pneumonias which we have ever seen. The state of induration in which we found the lung, could not be confounded with the state of red hepatisation or purulent infiltration which exists in cases of acute pneumonia. In these cases, in fact, the pulmonary tissue is engorged with liquid, which flows from it when cut into, or when squeezed; it is easily torn, and crumbles readily. Here, on the contrary, the pulmonary tissue was dry, and its cohesion was at least as great as in the healthy state. We shall also notice, as a well-marked character of chronic inflammation, the schirrus-like thickening of the interlobular cellular tissue.

In the subject of the preceding case, the eschar, detached from the pulmonary tissue, was still partly contained in the ulcerous cavity formed around it. Here the eschar had been completely expelled, and the empty cavity no longer retained any other trace of it than the gangrenous odour which it exhaled, and the greenish layer with which its parietes were lined. In both cases the same group of symptoms announced the existence of pulmonary gangrene; the most characteristic of these symptoms was, no doubt, the expectoration. The greyish and fetid sputa, such as we have described, seemed to us, in fact, to announce with as much certainty gangrene of the lung, as the red, transparent, and viscid sputa announce acute pneumonia. Tuberculous cavities, and particularly the bronchial mucous membrane in a state of chronic inflammation, may, no doubt, furnish fetid sputa,* but this fetor is far from being that noticed

* To the cases of this kind already mentioned (Observations on Bronchitis), I shall here add the following:—A phthisical patient, who had repeatedly had attacks of hemoptysis,

in the two cases last described. The appearance of these sputa is moreover so striking and so marked, that, in my mind, it is quite enough to have seen them once to be able to distinguish them from the sputa of any other disease of the lung.

Since the publication of the former edition of this work, some cases have been published where gangrene also seems to have come on, as in those just mentioned, after that group of symptoms which characterise that morbid state of the lung called *pneumonia*. A case of this kind, which occurred at the Hotel Dieu, under the care of M. Recamier, I shall here cite.

Case 44. — A plasterer, fifty-five years of age, had always enjoyed good health. In the beginning of May he experienced, after a chill which came on him whilst in a perspiration, some pain in the left side of the chest. The following days the pain of the side increased; there was cough; sputa tinged with blood; shivering every evening. He entered the Hotel Dieu, presenting all the symptoms of acute pneumonia: he was relieved by bleeding. At the end of twelve days he went out and resumed his work, but he scarcely had commenced it, when unusual lassitude, severe dyspnœa, and frequent cough, warned him that his disease, so far from having terminated, had now resumed more severity than before. Seven days after he entered the Clinique. That was the twenty-first day of the disease, which was then characterised by the following symptoms: — Skin yellowish; countenance pale and very much changed; frequent cough, with copious expectoration of deliquescent sputa like chocolate, and mixed with small whitish points floating on their surface, and which appeared to be pus, constituted of particles of gangrened pulmonary tissue, crumbling readily under the finger. This putrid pap diffused a well-marked gangrenous odour, and the expired air was impregnated to a high degree with a fetor no less repulsive, which encompassed the patient's bed with an infectious atmosphere. Percussion elicited a dull sound over the entire chest. The respiratory murmur cannot be heard on the right. On the left the respiration appeared bronchial, and was accompanied with a peculiar bruissement which rendered it very confused. Pulse weak but not frequent; the patient is in a state of extreme prostration; he lies on his back, inclining a little to the left. (Lemonade; nitric acid; fumigation with chloride of lime and camphorated vinegar.)

June 2d (twenty-third day of the disease), the *facies hippocratica* more marked. The odour of the breath and sputa stronger than on the preceding days; the patient seems to expectorate a black blood, which was pure and diffluent, of an insufferable stench, containing a deliquium of small clots of blackish pulmonary substance. The white points are less numerous. The chest is constantly sonorous on the right, where the respiration is puerile, and always difficult to be heard; the left side is much more sonorous. The respiratory murmur is so confused that we can distinguish nothing; pulse in the same state. Some purging without gastric symptoms. A little sleep during the night. (Same prescription.)

The 3d of June, the countenance a little better than yesterday. In general there is an apparent improvement in the state of the patient; but the pulse becomes more frequent, being now 120, small and very compressible. The gangrenous odour appears less marked. The purging continues. On the 4th of June (twenty-fifth day) the improvement not kept up.

experienced another; but this time the blood had an extraordinary appearance: at the bottom of the vessel there was found a liquid mass of a brown-red colour, which exhaled such fetor that it instantly reminded me of the fetor of gangrene of the lung. On the following day, the matter of the expectoration was of a dirty grey colour, like sanies, and its odour just as repulsive. I concluded that gangrene had formed in some point of the lungs. However, on the following days this odour gradually disappeared: the dirty grey tint of the sputa also disappeared, and the expectoration again became what it usually is in every case of phthisis.

The prostration increased, lies flat on his back ; countenance more seriously changed, and covered with a clammy sweat ; features drawn, skin wrinkled, eyes dejected and dull, anxiety greater. The patient still answers questions, but with indifference. Skin hot, pulse frequent, breath and sputa fetid, less so, however, than on the twenty-first day. The matter expectorated is of a greenish diffluent brown ; it has less the appearance of black blood. The white points formed by pus have reappeared in great numbers ; they assumed varied forms, and are scattered over a deliquium which has the consistence and colour of chocolate ; sonorousness greater on the left. A gurgling with a sonorous rale at intervals, and a confused noise is still the only sign afforded by the stethoscope. The patient died towards evening.

Autopsy thirty-six hours after. Some old adhesions between the right lung and the pleura costalis. There is on this side a slight effusion of bloody serum, but in other respects the lung was healthy, crepitating, and presented nearly the pneumonia of dying persons ; a reddish frothy serum flowed from its incision.

The left lung contracted very strong adhesions, particularly posteriorly and superiorly, and it cannot be removed from the thoracic cavity without being torn in its middle and posterior part, where the false membranes have more consistence, and where it is itself more readily torn. There then flowed into the pleura a great quantity of a blackish pap, similar to that which constituted the sputa, diffusing a fetor no less repulsive, and which may be estimated at more than half a pint.

An incision made along the posterior edge of the lung, exposed an immense ulcerous cavity occupying the whole extent of the pulmonary organ, and partly filled with a putrid substance, in every respect resembling both as to appearance and fetor, that which fell into the pleura the moment the sac was torn. On pouring water into this cavity, the water took up the deliquium, and we were able to see beneath it the polished and whitish parietes of the membrane, which lines all the interior of the sac, and to which some portions of the blackish substance branched out into small filaments still adhere, exactly resembling in colour river-weeds. These filaments were attached to the inner surface of the cavern by the bronchial ramifications, and their extremities were free and floating in the cavity. The slightest rub was sufficient to detach them, and there then remained merely the uniformly white parietes of the cavity. These parietes were formed by a false membrane of about a line in thickness, which separated the dead part from those which retained their vitality ; the latter, attacked by the inflammation, passed into the state of red hepatisation, and did not float in the water.

The false membrane circumscribed a cavity which occupied all the interior of the lung, leaving at the summit only about an inch and a half of pulmonary substance, which was passed to the state of grey hepatisation, and at the base a layer about half the thickness of tissue which had attained the same stage of inflammation. The inner surface near the origin of the bronchi again presented about an inch in thickness, whilst all the external and anterior surface was reduced to some lines ; the lower edge of the lung retained its crepitation to the extent of two lines all along its periphery. The part of the pulmonary tissue, which preserved the form of the organ, and which might be justly compared to mere bark, was affected through all its substance with the grey hepatisation.

In the summit of the lung, which was in the state of grey hepatisation, an incision developed a great number of miliary tubercles in a state of crudity in the centre, and exhibited posteriorly and superiorly a cavity capable of lodging a small nut, which resulted from the suppuration of several tubercles combined into a single cavity, which was filled with a homogeneous, whitish pus.

Nothing particular was observed in the other organs, except three superficial ulcerations in the vicinity of the ileo-cæcal valve.

RECAPITULATION; OR, GENERAL HISTORY OF PLEURO-PNEUMONIA.

62. The symptoms of pleuro-pneumonia, the greater or less danger it brings with it, the modifications which its treatment may undergo, are connected with the different states of the lung, with respect to its different degrees of inflammation. We shall, therefore, commence the history of pleuro-pneumonia where it is usually terminated, that is, by the description of the anatomical characters of inflammation of the lung.

Laennec has admitted three degrees in the inflammation of the pulmonary parenchyma, to wit, simple engorgement, red hepatisation, and grey hepatisation. We shall adopt this language, because it is simple and generally received. We think, however, we should remark, that the tissue of the lung affected with inflammation, bears too little resemblance to the tissue of the liver for the term *hepatisation* to deserve to be looked on as very exact. The lung inflamed to a certain degree and the liver in its healthy state differ from each other particularly in their consistence. In the state usually denoted by the term red or grey hepatisation, the tissue of the lung is exceedingly softened, and very friable; in some, but much more rare cases, it is harder than when healthy. Should these two states, of softening and hardening, so different from each other, and which, moreover, bring with them differences in the symptoms, be confounded under one and the same denomination? Were we not convinced of the extreme reserve with which unusual terms should be introduced into medical language, we would propose to lay down the following nomenclature for the different degrees of pneumonia. In acute pneumonia, we would admit three states of the lung, which we would designate by the names of *engorgement* (engouement), *red softening*, and *grey softening, with simple purulent infiltration or formation of abscess.* In chronic pneumonia, we would recognise these same states, and two others also, which we would call *red hardening* and *grey hardening*. We shall describe these different degrees.

63. In its minor degree of inflammation, in that degree designated by the name of simple engorgement, the pulmonary parenchyma still crepitates; it may be pressed, and drawn with considerable force without being torn. However, the crepitation is less in it than in the healthy state. On compressing the tissue of the organ, it is perceived that there is more liquid than air in the pulmonary vesicles. Oftentimes this crepitation then becomes so little, that one would suppose he pressed the lung of a fœtus which had not respired. The colour of the engorged part is changed; its brown or vermilion colour contrasts with the grey or pale rose-coloured tint of the portions of the lung which have remained healthy. If an incision be made into these engorged parts, a reddish frothy serum is seen to flow from them in considerable quantity. If the engorged parts, when cut into in different directions, be subjected to a long-continued pressure, and to frequent washing, these parts are freed from the liquid which they contained, and they are rendered as crepitating, as elastic and as void of colour, as the portions of the lung not affected with inflammation.

This simple engorgement, without any other alteration of texture, is observed only in the case of slight inflammation. But, however little the intensity of the inflammation may be, the pulmonary parenchyma diminishes in consistence; when pressed between the fingers, it crumbles with ease; it becomes friable. The liquid which flows from it, is less copious and particularly less frothy: it then presents considerable resemblance to the tissue of certain spleens, which are easily crumbled, without, however, being reduced to a pulp. This state constitutes an intermediate state between simple engorgement and the

real red softening (the hepatisation of authors). It is the transition from the first to the second degree of pleuro-pneumonia.

As long as the lung is only infarcted* (*engoué*) without any other change of texture, it is difficult to decide in all cases, whether this infarction is really inflammatory, or whether it is not the mechanical result of the sanguineous engorgement, of which the lungs are almost invariably the seat in the last moments of life, or even of simple cadaveric infarction. To distinguish these two states, it is necessary to have regard less to the colour of the pulmonary tissue, than to its consistence ; if any increase of friability be ascertained in this tissue, it should be considered as inflamed.† Now, in almost all cases where there really has been inflammation, this increase of friability will be observed, because it is extremely rare that death should be the result of a pneumonia, which shall not have been severe enough to destroy more or less the ordinary consistence of the pulmonary tissue.

From this simple infarction (*engouement*) then, from this commencing softening just described, the inflamed lung rises by little and little to another degree, in which, at first sight, it bears considerable resemblance to a liver, which, gorged with blood, is of a uniformly red colour. In this state the lung, having become impervious to air, no longer crepitates ; it no longer floats on water. If it be cut into, there still flows from it a red liquid, which is not frothy, and which is much less abundant than in the preceding degree. Examined with the lens, the pulmonary tissue then appears to be composed of a crowd of small red granulations, pressed one upon the other ; when torn, it often presents to the naked eye these same granulations : it is also torn with much more ease than in the healthy state. Its friability is very great ; in many cases it is sufficient to press it slightly between the fingers, to crumble and reduce it to a reddish pulp ; this *softening*, similar to that presented by several other inflamed tissues, establishes an important distinction between the parenchyma of the lung attacked with inflammation, and the parenchyma of the liver, which is thus soft and friable only in certain pathological states. To designate this second degree of inflammation of the lung by the term *red softening*, is, in our opinion, to give a more exact idea of it than to call it by the term hepatisation. In this degree, the size of the diseased lung always appears greater than the size of the healthy lung ; but this increase of size is but apparent ; it depends on this circumstance, that the lung, deprived of air, no longer collapses as that which is still filled with it at the time the chest is opened.

In a still more advanced stage, the pulmonary tissue dense, compact, and impervious to the air, as in the preceding stages, presents a characteristic greyish colour. If we examine it with the lens, we find the same granulations as those just described, only they are white or grey, instead of being red. Often, being larger, they become visible to the naked eye, particularly after their existence has been already ascertained with the lens. These granulations present, also, numerous varieties with respect to their arrangement, their number, and their size : thus, in a given space, we sometimes find some only, separated or agglomerated ; sometimes they are grouped in great quantity ; sometimes, in a word, they are no longer perceived, and we remark only a uniformly smooth grey surface. We shall presently endeavour to account for these differences of appearances.

* The term *engoué* is usually rendered into English *engorged*—the necessity of using some different term in this place will appear from what follows.—Trans.

† Since the above was written, new researches have inclined me to think that the increase of friability of the pulmonary tissue may be very well owing to the simple fact of an accumulation of blood, which may be altogether mechanical, and may have been established during the last struggle, or may have supervened after death.

Here, as in the preceding stage, the pulmonary tissue is softened and very friable. The quantity of liquid which penetrates the parenchyma of the lung is sometimes such, that on cutting it a greyish liquid is seen to gush from it, a real pus, which has appeared to us uniformly devoid of odour. At other times, merely making an incision is no longer sufficient to make the pus flow from it; but if the tissue be slightly compressed without crumbling it, the pus appears on the incised surface in the form of small drops, which seem to issue either from the orifices of capillary bronchi, or from the granulations themselves, which cease to be visible, after several pressures have been made on one and the same portion of lung. In this stage the more the pulmonary tissue is soaked in liquid, the more softened and friable it is: when pressed between the fingers, it is reduced into a greyish pulp, which differs not from the liquid itself, except in having a little more consistence. From this extreme friability, it happens that it is enough to sink the finger gently into any point whatever of the parenchyma, in order to produce there the formation of a small cavity filled with pus, which may be taken for an abscess of recent formation. Instead of designating this third stage by the name of grey hepatisation, we think it would be better to designate it *grey softening*.

Such are the alterations which characterise the different stages of acute inflammation of the lung. When the inflammation is chronic, the lung may still present these same alterations; but, further, it presents two other states which are not met in cases of acute inflammation, and in which the pulmonary parenchyma, instead of being soaked in liquid and softened, is dry and hard. Sometimes it preserves a pale red colour; sometimes, and that is the most ordinary case, it presents a grey tint. As we have admitted a red softening and a grey softening, in the same way we shall also admit of *red induration* and *grey induration*.*

We are not at all astonished at seeing the pulmonary tissue thus pass to the state of induration after having been first softened; a similar phenomenon is presented to us by a great number of tissues or of organs affected with inflammation. Thus, the cellular tissue, when inflamed, first acquires great friability; if the inflammation of which it is the seat be not resolved, if it pass to the chronic state, the cellular tissue soon loses this friability; far from becoming softer, it becomes, on the contrary, more dense, and much thicker; it often presents as it were a schirrous hardness. This termination by induration may be observed particularly, either in the cellular tissue surrounding old cutaneous ulcers, or in the submucous or subserous cellular tissue; in a word, it may be seen also in the cellular tissue which connects the different lobes of the lungs. This tissue, which is scarcely visible in the natural state, acquires, in some cases of chronic pneumonia, such thickness, that it is seen on the surface of the lung, and in its interior in the form of white lines, of semi-cartilaginous consistence, surrounding and circumscribing each pulmonary lobule.

It is common enough to find the three stages of acute pneumonia (engorgement, red softening, and grey softening) combined in one and the same lung, whether the inflammation may not have proceeded with equal rapidity in all the parts which it laid hold of, or whether it attacked them only successively.

The grey softening may form in a very short space of time. We have found, for instance, the entire of one pulmonary lobe, already arrived at this third stage before the end of the fifth day.

In the opinion of some physicians, chronic pneumonia is so rare an affection, that they even doubt whether they have ever seen it. Professor Chomel, in his

* To these two species of induration of the pulmonary parenchyma, we should add the black induration, which some persons have, incorrectly in my opinion, set down as a peculiar tissue, under the name of *pulmonary melanosis* (vide *post*, and my *Pathological Anatomy*).

article Pneumonia in the Dictionnaire de Médecine, twenty-one vols., says, that he saw but twice in the dead body, in the space of sixteen years, those lesions which characterise, according to him, chronic pneumonia. For our part we have seen it much more frequently, and it does not seem to be so rare an affection as has been stated. Its anatomical character we hold to be a hardening of the pulmonary tissue, which has become at the same time impervious to air, and which presents a yellow, grey, brown or black tint. Sometimes we found in this state of hardening, either an entire lobe, or a considerable portion of a lobe; sometimes it is lobules isolated from each other, which are thus indurated, and they are separated by a perfectly healthy tissue. Sometimes, in a word, the chronic pneumonia is still more circumscribed, and it attacks but a certain number of vesicles in one and the same lobule; in this latter case the lungs are traversed by a greater or less number of granulations, which have been considered, erroneously we think, as products of new formation. Again, in one or other of these three forms, the chronic pneumonia may succeed the acute form, which is rare; it may form insensibly, without the signs of an acute affection having ever been observed at any period of its existence; this second case is much more common than the first. Patients then present nothing but the symptoms of chronic bronchitis, accompanied with a dyspnœa which goes on increasing. Shall we add here that it is not at all rare to find undoubted traces of chronic inflammation around tubercles, particularly when they are softened, and transformed into caverns?

64. What is the part of the lung principally affected in the different stages of chronic pneumonia? Is it principally the intervesicular cellular tissue? Is it rather the vesicles themselves? Nothing certain can be affirmed on this subject; we shall however state what seems to us most probable.

When there is yet but simple engorgement, it is recognised during life by the existence of the crepitous rale. Now we shall endeavour to prove in a subsequent part that this rale is but the diminutive of the mucous rale; and that if it be certain and beyond doubt that the latter is seated in the bronchi, we cannot refuse to admit that a mixture of air and liquid in the smaller bronchi produces the crepitous rale; but the pulmonary vesicles appear to be nothing else than the last extremities of the bronchi expanded into a cul-de-sac.* It is then in these vesicles that the crepitous rale of the first stage of pneumonia appears to have its seat. If this proposition be accurate, it follows that pneumonia consists essentially in the inflammation of the pulmonary vesicles, the inner surface of which secretes a liquid at first muco-sanguinolent, and then purulent.

According as the inflammation proceeds, the liquid secreted becomes thicker and more viscid; it can no longer be expelled from the cavity where it is contained; it accumulates there, obstructs and distends it, and gives rise to those numerous granulations, which appear peculiarly to constitute the red hepatisation of the pulmonary tissue.

At a later period still it is no longer mucus, or blood, but pus which is poured out by the inner surface of the vesicles: this pus fills them in its turn; thence arise the grey granulations which the pulmonary tissue presents in this stage of the inflammation, and which seem to be nothing but the vesicles filled with pus. Several of these granulations often retain a pale red tint, a sort of mixture of grey and red colour, which seems to result from the mixture of pus and blood in the vesicle. If a portion of lung in the state of grey hepatisation be pressed, the pus is seen to issue from it in the form of drops, each of them seeming to come from a vesicle whose parietes have been burst. If the distension of the vesicles be general and carried to a great degree, they ultimately become confounded together, and the granular appearance is lost.

* See the splendid work of M. Reissessen on the structure of the lung.

The parietes of the inflamed vesicles become soft and friable, as all tissues do which have been attacked with inflammation. Thence the remarkable softening and extreme friability presented in this case by the pulmonary parenchyma. With respect to the last stage, in which the pulmonary tissue is dry and hard (grey induration), this variety may be explained by the consistence of the liquid which fills the vesicles, but more particularly the thickening and hardening of the parietes of the ventricles which are in a state of chronic inflammation: is not this the case, as we have already said, of a great number of chronic inflammation?

The ideas now expressed regarding the seat of pneumonia have, we repeat it, but mere probabilities to support them. In order to demonstrate their exactness, it would be necessary, scalpel in hand, to demonstrate the inflammation of the vesicles; now, this has not been done yet, and probably never can be done.* These ideas appear to us, however, entitled to some attention, because by viewing pneumonia in this way, we can better account for several phenomena, and we can explain much better the different signs furnished by auscultation.†

* I have stated in my work on *Pathological Anatomy* some researches, which bring under the cognisance of the naked eye the modifications which the parietes of the pulmonary vesicles undergo in pneumonia.

† With respect to the seat of pneumonia, we extract the following passage from the third volume of the Cyclopædia of Practical Medicine, article *Pneumonia*. After quoting the opinions of several pathologists on this subject, some of whom, and among them our author, place it in the air-vesicles and minute bronchi; others consider it to be in the interstitial cellular texture between those, whilst a third opinion supposes it to occupy all those indiscriminately, Dr. Williams, the able writer of the article, gives it as his opinion, that the plexus of capillary vessels, rather than any distinguishable texture, is the essential seat of pulmonary inflammation. "On inspecting," he says, "by the aid of a simple lens the margin of a slightly inflamed spot of lung, numerous vessels may be seen, distended with blood, passing across, around, and between the vesicles, with very little regard to their form or disposition; and as the scrutiny is extended to a part more inflamed, these vessels are so multiplied and confounded with each other, as to be no longer separately discernible. In this state it is impossible to distinguish whether the tunics of the cells, or the tissues which connect them, are most affected, for they all appear one mass of redness, in which are seen the cells irregularly diminished in size, and containing bloody serum with bubbles of air. The interstitial cellular texture, where it can be separately discerned, namely, between the lobules, and around the larger bronchi, is generally less vascular and of a lighter colour than the other parts, and in some instances appears to be nearly free from the inflammation. The lining membrane of the minute bronchi, although generally of a deep-red colour, is sometimes bluish-red, as if from redness under it rather than in it; and on tracing these tubes higher, the presence of this inflammatory character is very uncertain. These examinations and some pathological considerations induce us to consider the capillary ramifications of the pulmonary artery and veins to be the proper seat of pneumonia, and that these may involve more or less of the tissues through and around which they pass. Thus through them the tunics of the air cells, particularly the submucous, commonly become the seat of inflammation; whence are formed the granulations of ordinary hepatisation. When, again, the inflammation is confined more to the inter-vesicular plexus and tissue, which appears to be the case in the more congestive form of inflammation where vessels larger than capillaries are involved, the uniform non-granular form of hepatisation, which we have before described, is produced. If, as is commonly the case, the inflammation extends to the extremities of the bronchial arteries, which are said by anatomists to anastomose with the pulmonary, the mucous membrane lining the vesicles and minute bronchi partake of the inflammatory action, and exhibit it in the manner peculiar to mucous membranes by the secretion of a viscid mucus, and afterwards of pus. So, likewise, when the inflammation reaches the surface of the lung, it is generally, but not constantly, propagated to that portion of the pleura, which invests it and derives its vessels from it; and this extension of the inflammation may add another character to such instances of the disease. But it is its seat in these extensive capillaries of the lungs through which the blood of the whole system is continually passing,—it is this affection of so considerable and important a portion of the circulatory system that causes the severe and intense characters of pneumonic inflammation; and the more constantly we hold this in view, the better shall we understand the pathological history of the disease and its important relation to remedial measures."—Trans.

65. We have just seen that there is a stage of pneumonia where real pus is scattered through the pulmonary parenchyma, whatever be the part it occupies. Is this pus collected at times into one focus, so as to constitute an abscess? At the period of the infancy of pathological anatomy, — I mean before the works of the French school of the nineteenth century appeared, — physicians regarded the formation of an abscess in the lung as a very common thing, in consequence of its acute or chronic inflammation; but it is now very evident that, in their cases, they really speak of interlobular pleuritic effusions, or softened tuberculous masses. The ancients also thought that pneumonia was often cured by the spontaneous evacuation of one of these abscesses, as they call them, which they designated by the name of *vomicæ*. Now, it is well known at this day, that these vomicæ are the result of changes which differ essentially from an abscess of the lung; sometimes it is a large tubercle, which is softened, and is discharged all at once through the bronchi; sometimes it is pus collected in one of the pleuræ, which has perforated the lung, and has been suddenly expectorated. Sometimes, in a word, as we have frequently seen instances, it is merely a profuse purulent secretion, poured out suddenly by the bronchial mucous membrane.*

Since pathological anatomy has come to be cultivated with more strictness, those cases have been set down as very rare, where pneumonia has been seen to terminate by the formation of an abscess. At the period when Laennec published his work on auscultation, purulent collections were found but five or six times in the inflamed lung; they were yet very small. The largest abscess met could scarcely admit the ends of three fingers joined together. As for ourselves, it has never fallen to our lot more than once to see a real abscess after a pneumonia at the La Charité; it was in the case of a patient who died the nineteenth day of inflammation of the lungs; the middle and lower lobes of the right lung were in a state of grey hepatisation. Towards the middle part of the lower lobe, there was observed nothing but a sort of pap (*bouillie*), of a dirty grey colour, in the centre of which was found real pus, which exhaled no odour; the pulmonary tissue around, which was at first very soft, and, as it were, broken down, gradually recovered a greater consistence; no particular sign had disclosed to us during life the existence of this abscess. Auscultation was then scarcely known (1819). We have seen another well-marked instance of abscess, after pneumonia, in an individual whose lung was presented to the Royal Academy of Medicine, by Dr. Honoré, in 1823. The patient had died of acute pneumonia, in the wards of the infirmary of Bicêtre: in the centre of a hepatised pulmonary lobe, there existed a rounded cavity with smooth parietes, capable of holding a large apricot: it was found full of pus.

We have already noted a circumstance, which, more than once, has induced persons to believe in the existence of an abscess of the lung. It is the extreme ease with which a cavity may be formed by slight pressure in the middle of the soft and friable pulmonary tissue, such as it is found to be in the third stage.†

* "The general testimony of the latest pathological anatomists is in support of the opinion of Laennec, that the termination of pneumonia in abscess is of rare occurrence. Broussais says that he only met it once; and in this case the inflammation was produced by a musket-ball lodged in the lung for six years. . . . . If we compare these opinions with the writings of Morgagni, Baillie, or, in fact, any writer on morbid anatomy prior to the last twenty years, or with the notions of the less informed of the present day, we shall be surprised at their discrepancy with the frequent mention of abscess of the lungs by these latter. The common error has been to mistake tubercular vomicæ, which are of very common occurrence, for abscess; and it is not easy always to avoid the mistake, even in the present state of our knowledge."—*Dr. Williams*, loc. cit.—Trans.

† Since the publication of the first edition of this work, I have twice met, in the lungs of new-born infants, abscesses which bore no resemblance whatever to a tubercular mass.

66. Pneumonia may also terminate in gangrene, as we have already seen. But this, again, is nearly as rare a termination, as that in the formation of abscess. The ancients have evidently described under the name of gangrene alterations of the lung very different from that state. In general they were very much inclined to call it gangrene every time an organ presented to them a brown or black colour. Their works are filled with accounts of gangrene of the brain, lungs, liver, intestines, &c.; and yet nothing is more seldom seen than real gangrene of these different organs. It appears also very well proved that the lung may be affected with primitive idiopathic gangrene without it being preceded by any sign of inflammation. This however is not the place to speak on that subject.*

67. Pneumonia may be simple or double; in other words, it may attack but one lung, or both at the same time. In one and the same lung it may be general or partial, attack the upper or lower lobe, be confined to the base, the root, or the centre. It has been said that these different seats of pneumonia have been all equally frequent. We shall just detail some numerical results on this matter.

Out of one hundred and fifty-one pneumonias observed at the La Charité, ninety affected the right lung, thirty-eight the left lung, seventeen existed simultaneously on both sides; the seat of the other six was not known.

Out of one hundred and fifty-nine pneumonias recorded in the works of Morgagni, Stoll, De Haen, Pinel (*Médicine Clinique*), and Broussais (*Traité des Phlegmasies Chroniques*), thirty-one were observed on the right, twenty on the left, and eight on both sides at once.

Thus, on the entire, out of two hundred and ten pneumonias, we found one hundred and twenty-one on the right, fifty-eight on the left, twenty-five double, and six whose seat could not be determined.

68. It has been stated that the upper pulmonary lobes were scarcely ever attacked with inflammation. We can state that they are inflamed often enough, less frequently, however, than the lower lobes. In fact, out of eighty-eight cases of pneumonia we have found inflammation of the lower lobe forty-seven times, that of the upper lobe thirty times, and the entire lung inflamed eleven times.†

69. Pneumonia, considered with respect to its seat, presents a variety which it is important to notice, in consequence of the obscurity which its diagnosis often presents. In this variety the inflammation no longer occupies a greater or less extent of the lung continuously; but it is dispersed over a number of isolated points separated from each other by perfectly healthy tissue. These partial pneumonias occupy a space which varies from that which might be filled by a large orange, to that which a nut or a pea would occupy. When a lung thus partially inflamed is sliced, we observe on the surface of the cut portion a greater or less number of small red or grey patches, according to the stage of the inflammation, which form a striking contrast by their colour with the healthy tissue

* Laennec questions whether gangrene of the lung is ever the result of inflammation; he considered this lesion as essential or idiopathic, like hospital gangrene, and as the cause rather than the effect of the inflammation. It is, however, admitted, that gangrene of the lung does sometimes succeed to inflammation of this organ, though it may also occur independently of it.—Trans.

† With respect to the portions of the lung most frequently attacked by pneumonia, the results of dissection and of clinical observation do not coincide. Hence Morgagni, Frank, and Broussais, who draw their conclusions from dissections, state that the upper lobes are most frequently the seat of inflammation, whilst Laennec and Andral, who included cases of recovery in the calculation, found the lower lobes to be most commonly inflamed. Dr. Williams, however, reconciles the discrepancy by assigning as the cause of it the fact, that inflammation of the upper lobes is the most frequently fatal.—Trans.

separating them. Where they do exist, there are observed also different degrees of hardness, softening, or consistence, according to the intensity and stage of the inflammation: sometimes there is observed but a small number of them, sometimes they are very numerous; and if we then conceive them to be all combined, we see that they occupy a considerable portion of the pulmonary parenchyma, that they are tantamount, for instance, to the inflammation of an entire lobe. These partial pneumonias are found indifferently in all parts of the lung. However, with respect to diagnosis, we should particularly distinguish inflammation confined to the superficial layer of the pulmonary tissue, which is in contact with the ribs, to the anterior edge of the lung, to its diaphragmatic surface, to its root, and finally to its centre. We have already seen instances of these different forms. It is not uncommon to find, among these partial inflammations, the pulmonary tissue infiltrated with a great quantity of serum: this infiltration is easily distinguished from an inflammation, both by the nature of the liquid, which is colourless, and more particularly by the elasticity and consistence of the pulmonary tissue being still retained.

70. Inflammation of the bronchi uniformly accompanies inflammation of the pulmonary parenchyma. Their mucous membrane presents an intense redness, which is nearly equal in the great and small ramifications. When a single lobe is inflamed, the redness often exists only in the bronchi distributed to this lobe.

71. In the majority of cases traces of inflammation are found, such as greater or less injection, albuminous concretions, slight serous, purulent, or sanguineous effusion into the pleura corresponding to the affected lung; accordingly we have designated inflammation of the pulmonary parenchyma by the term pleuro-pneumonia. It must not be supposed, however, as was for a long time thought, that in every pneumonia there is also pleuritis: for on more than one occasion, after the most scrupulous examination, the pleura has been found healthy. Sometimes, too, though there was double pneumonia, we have found pleuritis only on one side. It is very uncommon to meet considerable effusions into the pleura on the same side as the pneumonia: it may be conceived that such an effusion would be impossible in the case where the entire lung should be hepatised. Once we saw the inferior part of one of the sides of the chest occupied by a vast effusion; it had compressed only the lower lobe of the lung towards the vertebral column; above it was bounded by the upper hepatised lobe, which adhered to the ribs, and formed in some measure the vault of the cavity filled by the effusion.

72. The right cavities of the heart are ordinarily distended by black coagulated blood. Unless in cases of complication, the other organs present nothing remarkable except venous congestion, which is carried to an extreme degree in the liver, spleen, and intestines, and is also variable, according as the last struggle is of greater or less duration, and according as the respiration has been more or less embarrassed.

73. We shall dwell very little on the occasional causes of pleuro-pneumonia; they are mentioned by all writers. In many cases they are very obscure, and their importance has been oftentimes exaggerated. Here too, as well as in the production of all other diseases, there must be admitted a predisposition, without which the occasional causes possess no influence. It is in virtue of this same predisposition that the same cause produces in one person angina, in another simple bronchitis, in a third a pleuro-pneumonia, in a fourth gastritis or peritonitis. Among persons who have been exposed to the action of a cold temperature whilst they were perspiring, the smallest number are affected with pneumonia. On the other hand, a pulmonary inflammation often manifests itself without our being able to refer it to any appreciable occasional cause.*

* "The influence of cold in producing inflammation of the lungs is sufficiently apparent in the much greater prevalence of the disease in cold seasons and cold climates. Of ninety-seven

Among the number of the occasional causes of pleuro-pneumonia, some have placed the suppression of certain acute exanthemata — namely, of small-pox, measles, and scarlatina. I think that the effect has here been taken for the cause. In the cases where one of these exanthemata recedes and fades, is not well developed, or disappears prematurely, the most common cause should be referred to the existence of an internal inflammation, and particularly that of pleuro-pneumonia. The symptoms of this intercurrent inflammation are often very slightly marked; it readily escapes even attentive observation. The complication of small-pox with a pleuro-pneumonia, a gastro-enteritis, or a meningo-cephalitis, certainly constitutes a great number of those bad cases of small-pox called by the ancients *malignant*. The apparent freedom of breathing has inspired a fatal security in cases of this kind. Whether then the breathing be free or embarrassed, we should never neglect to percuss or auscultate the chest frequently at the onset, in the course, and at the termination of variola. How, without the employment of this double method, could we recognise in several small-pox patients, among children particularly, a pneumonia which is not announced either by cough, dyspnœa, or expectoration, and which is masked under a group of dynamic or adynamic symptoms?

Pleuro-pneumonia may be sometimes the result of external violence on the thoracic parietes. This would constitute traumatic pleuro-pneumonia. Why, in fact, like the brain and liver, should not the lung become inflamed under the influence of this order of causes?

Among the number of predisposing causes of pleuro-pneumonia, must be placed the existence of pulmonary tubercles. It rarely happens that phthisical patients are not several times affected with acute inflammation of the lung during their long illness. It seems to be occasioned by the habitual irritation which the presence of tubercles produces in the pulmonary parenchyma. It is, besides, a general rule for all organs where accidental tissues are developed. Thus the intestinal mucous membrane is inflamed and ulcerated above the tubercles formed between it and the subjacent membranes. Thus the brain is softened and disorganised around the different tumours which arise in its parenchyma. The frequent returns of pulmonary inflammation favour in their turn the development of tubercles, and thus become one of the frequent causes of the premature death of several phthisical patients. (See Cases 33 and 34.)

Cases of pleuro-pneumonia do not occur with equal frequency in all seasons. They are most common during spring. The months of March, April, and May, are those in which we meet a greater number of them every year in the La Charité. We have constantly seen this class of diseases succeeded, during summer, by a great number of intestinal inflammations.

The result of our observation is that all ages are almost equally subject to inflammation of the pulmonary parenchyma. Children, in particular, are very frequently attacked with it. The pleuro-pneumonia of infants constitutes even an important variety of this disease. We shall presently speak of it at greater length.

74. The onset of pneumonia takes place in several ways. In the generality

cases, recorded by Louis in Chomel's wards, at La Charité, during five years, eighty-one occurred between February and August, and only sixteen in the remaining five months of these years. . . . . Of two hundred and forty-three cases, which were treated at the Edinburgh New Town Dispensary, during three years, ending September 1, 1824, sixty-seven occurred from 1st September to 1st December; one hundred and four from 1st December to 1st March; ninety-four from 1st March to 1st June; and sixty-eight from 1st June to 1st September. We have observed in London nearly an equal prevalence of the disease from the beginning of December to the end of April, and a considerably smaller proportion in the remaining months; but it appears generally that the latter winter and early spring months are most fertile in producing pneumonias in these climates."—*Dr. Williams*, loc. cit.—TRANS.

of cases, the patients are seized all at once, often without any obvious cause, with a shivering more or less violent and a pain in the side. The shivering ordinarily precedes the pain of side; at other times, however, the contrary takes place. In several patients no pleuritic pain marks the commencement of pneumonia; in others there is not even a shivering, and the first symptoms are a cough of greater or less severity, with oppression and fever.

Pneumonia oftentimes imperceptibly succeeds a bronchitis. The inflammation then seems to extend by little and little from the large to the small bronchi, and ultimately to reach the pulmonary vesicles. In this case, sometimes the appearance of a pleuritic pain, the oppression, which suddenly increases, mark the existence of pneumonia; sometimes, on the contrary, the symptoms of catarrh usually take on greater intensity; one might then suppose that there was only superacute bronchitis when the parenchyma was already attacked with inflammation. Thence the necessity of always having recourse to auscultation (for at this first period percussion is useless, the sputa are still those of catarrh), every time that a bronchitis is sufficiently acute to be accompanied with oppression and fever.

In some cases more infrequent than the preceding, we observe for some days the general state constituting inflammatory fever. This state is principally observed in plethoric persons, in whom it would seem that too rich or too abundant blood stimulates the organs too violently, and places them all, in a manner, on the verge of inflammation. Hence the red injection of the external mucous surfaces of the conjunctiva, lips, and tongue, no more indicates the inflammation of the deep-seated mucous membranes than the redness of the face and rose-coloured tint of all the cutaneous system indicate genuine inflammation of the skin. In no part as yet is there a well-marked local inflammatory process; but everywhere there is a tendency to its production, and however short a time this state may last, we shall soon see, according to the predispositions and variable susceptibility of the organs, a gastritis arise in one, an arachnitis in another, a pneumonia in a third. In such case the attack is often not announced by any well-marked local symptoms; there is neither shivering nor pain of side, but some cough supervenes, and the breathing is hurried. This is the state designated by the ancients under the name of *peripneumonic fever*. When the pneumonia commences in this way, it may be very readily overlooked till the appearance of the sputa, for the cough is often slight, and such as exists in simple bronchitis; with respect to the dyspnœa, it often happens that patients do not complain of it, and the acceleration of the respiratory movements either may not be perceived at all, or else regarded as the simple result of hurried circulation. Thence the importance of scrupulously examining the organs; thence the necessity of auscultation.

Such are the different ways in which pneumonia commences when it is primary; but if it appear during the course of some other affection — if, for instance, it complicate either typhoid fever or another inflammation — if it supervene in an individual labouring under pulmonary phthisis, or aneurism of the heart, its commencement still presents some modifications important to be known.

In typhoid fever, pneumonia often marks its commencement by intense dyspnœa, but nothing can be inferred from this isolated sign, for in these diseases the respiration may be very much hurried, and become extremely embarrassed without pneumonia being present. The appearance of dyspnœa should then only awaken our attention, and urge us to ascertain the state of the lungs by auscultation and percussion. At other times, in these same fevers, the commencement of pneumonia is not marked by any perceptible modification of the respiratory phenomena, and the autopsy alone reveals the existence of pulmonary inflammation.

In many inflammations which, by their extreme acuteness, have thrown the patients into a false adynamia, the invasion of the pneumonia, far from being announced by greater or less reaction, is, on the contrary, only marked by a sudden and fatal prostration. The same phenomenon is again observed in several cases of chronic inflammations, which have thrown patients into the extreme stage of exhaustion and marasmus. Does a pneumonia supervene then? It is often not announced either by pain, dyspnœa, nor by cough, but we merely remark the rapid emaciation and the alteration of the countenance, as also the sudden premature increase of the general debility.*

In phthisical or aneurismatic patients, a greater dyspnœa ordinarily marks the onset of the pneumonia; but this dyspnœa may be fairly regarded as the result of a mere exasperation of the pre-existing affection; and as, in these patients, the signs furnished by percussion and auscultation often have no longer any value, it follows that in them the attack of a pneumonia may be very readily overlooked.

In fine, there are none of the cases which we have just considered, wherein auscultation, which might seem the surest mode to detect with certainty the period of the commencement of pneumonia, may not become insufficient; that is, when the inflammation commences to occupy the root or centre of the lung.

Nothing then is more variable than the commencement of pneumonia. What shades, what different forms in the attack, from that which is announced by shivering, pleuritic pain, dyspnœa, modification of the respiratory murmur, to that which is not marked by any characteristic sign, and which merely produces, according to the dispositions of the subject, one or other of those forms of disease constituting what is called *essential fever*. We should not forget those cases of perfectly latent pneumonia, which in their turn supervene in the midst of those same fevers, when the point of commencement of the latter has been the intestine or some other organ. What clinical experience is not required to recognise in the midst of so many different states, the existence of one and the same lesion! However, such knowledge is most important: how many pneumonias become fatal, because that being overlooked at their commencement, they are not then properly met!

75. After having marked the different modes in which pneumonia commences, we must now mark its symptoms.

This disease presents the following characteristic symptoms: pain more or less marked in one of the sides of the chest, dyspnœa, viscid and bloody sputa, dull sound, and modification of the respiratory murmur, febrile disturbance.

We shall first describe each of these symptoms in particular, then we shall point out how they commence, increase, and diminish, how they are grouped and connected together in the different periods of the disease.

76. Pain exists in pneumonia only when there is pleuritis at the same time, and that is the most usual case.† This pain is felt on the level of, or a little below, either breast; more rarely it is seated either below the clavicles, or entirely at the lower part of the ribs, and even in the hypochondria, or, in fine, over all the extent of the thoracic parietes of one side. Variable in intensity, it is at the commencement of the disease that it is most acute; it then gradually diminishes, and ordinarily ceases to exist a long time before the termination of

* It is principally in old people that pneumonia, with or without characteristic sputa, often gives rise to that group of symptoms which constitute the adynamic fever of Pinel, without there being any gastro-enteritis.

† Laennec asserts, on the contrary, that there is frequently very acute pain, when there is no pleuritic inflammation at all. Dr. Williams coincides with him in this opinion.—Trans.

the pneumonia; it sometimes survives the latter; in some cases we see it disappear and return several times. In some patients it precedes by several days the appearance of the other symptoms: being then accompanied neither with fever, cough, nor dyspnœa, it simulates a pleurodynia, or simple rheumatic pain. It is increased by coughing, by the movements of inspiration, sudden changes of position, and intercostal pressure and percussion: it is principally exasperated by lying on the side in which it exists. In all the patients who have presented this pain to us, we found the pleura inflamed, and covered with membraniform albuminous exudations. On the contrary, we have uniformly seen the absence of the pain coincide with the healthy state of the pleura; but here the converse cannot be asserted, and we often find the pleura inflamed in persons in whom no pleuritic pain has been observed. When this membrane is not inflamed, the patients experience, in the affected side, merely a sense of embarrassment and uneasiness, a sort of more or less painful weight, an annoying and deep-seated sense of heat, but never a real pain. Thus the ancients said, with much justice, when speaking of pneumonia: *affert plus periculi quam doloris.* We shall have occasion to recur again to the pleuritic pain, when speaking of the inflammation of the pleura.

77. The dyspnœa, in pneumonia, is generally in the direct ratio of the extent of the inflammation, of its seat, and of its intensity in each of the points which it occupies. However, this rule is liable to numerous exceptions. In consequence of unaccountable idiosyncrasy, there are some individuals, a very small portion of whose lung is in the first stage of inflammation, and whose breathing, nevertheless, is very much embarrassed. There are others, in whom a much greater portion of the lung is inflamed in the second or third stage, and who still feel much less dyspnœa. The greater or less embarrassment of the breathing is not then always a faithful index of the extent of the pneumonia and of its degree. It appears, *cæteris paribus*, that inflammation of the upper lobes gives rise to greater dyspnœa than an equally extensive and equally advanced inflammation of the lower lobes.

Moreover, we should be particularly cautious not to depend too much on what patients say regarding the greater or less embarrassment in their breathing. It is a very remarkable thing to hear a great number of these patients assert that they feel no oppression, though their breathing may be evidently short and hurried.

The dyspnœa of pneumonia presents several degrees. When it is not very considerable, patients are not aware of it; they speak with ease and freedom: some attention too is required to perceive that the inspiratory movements are shorter, more hurried than in the natural state; it is principally the stronger elevation of the ribs which reveals this slight degree of dyspnœa. In this degree, patients may change position, lie on their back or side, sit up in their bed without feeling annoyance, or perceptibly increasing the difficulty of their breathing. In a greater degree, the patient may still not feel any oppression; but the inspiratory movements are short and frequent; the breathing is performed at once by a considerable elevation of the ribs, and a marked depression of the diaphragm; deep inspirations are impossible: speech is interrupted and panting; sudden movements in the bed, and particularly the action of sitting up, singularly increase the difficulty of breathing; the patient then is oppressed. In a still higher degree, the oppression is as much felt in the state of rest as in motion. Patients often complain of having on their chest, as it were, a weight which smothers them; when we observe them, it seems that, strangers to every surrounding object, they are entirely occupied with respiring: the face of a violet red, or livid pale colour, expresses intense anxiety; the nostrils are dilated strongly; the respiratory movements are very frequent and very short, as if the air could not penetrate beyond the first divisions of the bronchi. The

patients can scarcely speak, whilst they are panting and as it were out of breath. When the difficulty of breathing is carried to such a pitch, the termination is seldom favourable: we have, however, some instances of it.

It sometimes happens that the side of the chest where the pneumonia exists remains entirely immoveable amidst the violent efforts which the patient makes to breathe. But this phenomenon, of rare occurrence in pneumonia, is more frequently observed in the case of pleuritic effusion.

After most of the symptoms of pneumonia have ceased, the breathing often remains still embarrassed for some time. This dyspnœa is not perceptible as long as the patient remains at rest; but it reappears the moment the patient attempts to rise and walk. As long as this residue of dyspnœa continues, we must suppose that the resolution of the pneumonia is not yet complete.

78. At the same time that the pain appears and the dyspnœa manifests itself, the ear applied to the thoracic parietes, recognises a perceptible modification in the natural murmur which is heard at each inspiratory movement; according as the pneumonia progresses, this murmur undergoes new modifications, which point out with greater or less precision the seat and degree of the pulmonary inflammation. The voice is equally modified.

If we auscultate the chest from the very onset of the pneumonia, this is what we observe in the majority of cases. On the side where the pain is manifested, the natural respiratory murmur has lost its clearness; it is mixed to a greater or less extent with a dry rale, designated by Laennec *the crepitous rale*, in consequence of the resemblance between the sound it produces and the sound which is heard when a salt decrepitates on burning coals. Oftentimes also it has a still more perfect analogy with the particular sound produced by rubbing a bit of parchment.

During the first moments of the existence of this rale, it alters and obscures the natural murmur of respiration, but it does not entirely mask it. According as the inflammation advances, it becomes more and more marked, and finally conceals altogether the inspiratory souffle.

The crepitous rale indicates engorgement of the lung; whilst it exists, it is a proof that, in several points at least, the pneumonia had not passed the first stage. But from its greater or less intensity, from its greater or less mixture with the natural murmur of respiration, we may deduce signs regarding the more or less advanced state of the first degree, regarding even the union of the first with the second degree. As long as the natural respiratory murmur predominates over the crepitous rale, we should infer that the inflammation is slight. If the crepitous rale becomes in its turn predominant, if ultimately it altogether masks the respiratory murmur, it is a certain index that the pneumonia has made progress, that it has a tendency to pass to the second degree. When the patients die whilst they present the crepitous rale in this degree, we generally find the lung simply engorged, though it be still pervious, its tissue is now softened and friable; it admits of being torn with considerable ease. At a later period still, the crepitous rale ceases to be heard; but then two cases may present themselves: either at the same time that the crepitous rale diminishes, the natural murmur of respiration is heard anew, or this murmur does not return, and at the same time sometimes nothing is heard; sometimes this murmur is succeeded by another, which we shall speak of presently. In the first case, we must admit that the pneumonia progresses towards resolution; in the second case we attain the certainty that the disease becomes more severe, and that the lung is being hepatised.

The dry crepitous rale, such as we have described, does not always present itself with such marked characters. In several cases it is more moist, and approaches by imperceptible shades to another species of rale, which results solely from a mixture of air and liquid in the large bronchi (the mucous rale of

Laennec). On the other hand, we often hear a rale entirely similar to the crepitous rale in persons who are affected only with an intense bronchitis, and in whom there is found after death neither pneumonia nor pulmonary œdema. What then is the crepitous rale? what is its seat? how is it produced? It is very evident that in the last mentioned individuals, it can only result, as the mucous rales, from a mixture of air and liquid in the bronchi. If we then reflect that these two rales present a number of degrees and shades where they are confounded, we shall conclude that they are produced by the same cause, that is, by the murmur occasioned by the passage of the air through the different liquids which may fill the air tubes. Always reasoning from analogy, and considering that the mucous rale in its turn is often confounded with the gurgling of cavities, we shall conclude that these different murmurs, owing to one and the same cause, present no especial difference except in reference to the size of the cavity where they take place. Thus, the gurgling is heard in very large cavities, the mucous rale in the large bronchi, the crepitous rale, which approximates to the mucous rale, in the smaller bronchi: in fine, the crepitous rale, characteristic of pneumonia, in the finer bronchi, and particularly in the pulmonary vesicles. These three varieties of one and the same murmur might be designated by the names, *cavernous rale*, *bronchial rale*, and *vesicular rale*.*

The crepitous rale, announcing the first degree of pneumonia, was pointed out by Laennec, who has also very correctly stated, that when hepatisation of the lung has succeeded engorgement, the ear, applied to the chest, perceives the thoracic parietes rise at each inspiration, but no longer perceives any murmur, whether natural or pathological. We have now verified the accuracy of these assertions. But at the same period of the pneumonia, there is often observed another very remarkable phenomenon, which does not seem to us to have engaged so much the attention of Laennec.† In several patients whose lungs are in the state of red or grey hepatisation, the respiratory murmur does not disappear; but it is singularly modified, and it is clearly no longer the same kind of murmur that is heard. One would then say that an individual placed near the ear of the person who listens blows into a tube. Thence the name of *tubary souffle*, by which this modification of the respiratory murmur has been designated. At other times, on the side where the sound is dull, the normal respiratory murmur is heard, without the admixture of any rale; it is only of greater intensity than on the healthy side, so that if one were not apprised of the possibility of such a mistake, the lung which is diseased, and into the substance of which the air no longer enters, would naturally be regarded as the healthy lung. At the same time the voice is modified in its resonance. This modification of the voice is not properly that of œgophony, nor pectoriloquy; it approaches more to the modification which the voice undergoes in the case of dilatation of the bronchi (bronchophony). Every time that patients have died who presented these modifications of the respiratory murmur, and of the voice, we have invariably found either red or grey hepatisation of the lung, or, as we shall see presently, a pleuritic effusion. We have not observed them during life, except in cases where the very dull sound and aggregate of the other symptoms announced a pneumonia in the second or third degree, or else an effusion into the pleura.

Such a modification of the respiratory murmur and voice seems to us to admit of an easy explanation. It appears to us to depend on the circumstance of the air not being able to penetrate beyond the large bronchial tubes. Thus it

* The qualities of the liquid expectorated, and particularly the different degrees of viscidity must still modify the rale very considerably.

† This was written before Laennec published his second edition.

is not only manifested in the case of pulmonary hepatisation ; it is also observed in the case where a pleuritic effusion compresses the tissue of the lung ; every time, in fact, that the air cannot reach as far as the pulmonary vesicles. The cause of this peculiar respiratory murmur being determined, we shall call it the *bronchial respiration*, in contradistinction to the natural respiratory murmur, which we shall designate the *murmur of pulmonary expansion, vesicular respiration.*

When the pneumonia proceeds towards resolution, and begins to repass from the second to the first stage, some crepitous rale is again heard. At the same time the bronchial rale becomes less and less perceptible, the peculiar resonance of the voice also ceases by little and little ; the crepitous rale ceases in its turn, and is succeeded in its turn by the clear murmur of pulmonary expansion. Oftentimes the crepitous rale continues in some points, and even over a considerable extent of the lung, a long time after the cessation of all the other pneumonic symptoms, and the disappearance of all fever. Without auscultation one would suppose the pneumonia entirely resolved, the slight cough which still exists would not seem to merit serious attention, and yet, as long as this rale exists, we may be certain that the resolution of the pneumonia is not complete, and we should apprehend either a relapse and return of the disease to the acute state, or the continuance of a nucleus of latent inflammation from which disorganisation of the lung may sooner or later result.

As we often find, after death, the three degrees of pneumonia united in one and the same lung, so we often observe in one and the same individual, at the same period, the different auscultatory signs which indicate the simultaneous existence of these different degrees. Thus, in one point we hear some crepitous rale alone, or mixed with the murmur of pulmonary expansion ; in another point we hear the bronchial respiration ; in other parts, again, we perceive neither rale, nor respiratory murmur, nor resonance of the voice.

At the same time that auscultation gives on the affected side the different signs just mentioned, the murmur of pulmonary expansion is heard on the healthy side with much greater intensity than what is heard in the physiological state, as if, in order to supply the place of the affected lung, the lung which has remained healthy should receive in a given time a greater quantity of air. This unusual intensity of the respiratory murmur on one single side should of itself suffice to excite suspicion of some lesion in the other lung.

It sometimes happens that the great quantity of liquid accumulated in the bronchi occasions a bronchial rale so loud, that it masks all the other sounds, and the state of the pulmonary parenchyma can no longer be known by auscultation.

Finally, there are cases, where, though there may be pneumonia, auscultation learns nothing regarding its seat and degree. The ear applied to the chest hears every where the murmur of pulmonary expansion very distinct, but at the same time much louder than in the natural state. This happens when it occupies but a circumscribed portion of the lung, remote from its surface, and particularly a portion of its base, centre or root. We may also perceive how little information auscultation must supply when the inflammation exists only in some isolated lobules. (Case 21.)

Thus we have met three cases in which the pneumonia produces a respiratory murmur louder than usual. In the first of these cases, it is in the same part of the lung where a very dull sound exists, that this increase of the normal murmur of pulmonary expansion is heard. In the second case it is still on the side of the affected lung that it is heard, but only in the healthy portions of the pulmonary parenchyma situated around the affected part. Finally, in the third case, it is only on the side of the healthy lung, that the respiratory murmur presents unusual strength.

78. We shall not dwell on the generally recognised advantages of percussion of the chest for the purpose of distinguishing the seat and intensity of the pneumonia. Before auscultation was employed, percussion alone could detect a great number of pneumonias more or less latent: at present, far from giving to one of these two methods an exclusive preference, we should always employ them simultaneously, and endeavour to confirm the results afforded by the one by the results of the other.

With regard to their respective degree of utility, it is certain that auscultation goes farther than percussion. There are a great number of pneumonias in the first degree during the course of which no diminution is observed in the sonorousness of the thoracic parietes; auscultation, on the contrary, affords in this case very valuable information. In all pneumonias the sound becomes obscured only towards the second or third day, sometimes not till a later period; here, again, auscultation gets the start of percussion, and from the very onset it announces the seat of the inflammation. Finally, at the period of the termination of the pneumonia, when the dulness of sound has disappeared, and percussion no longer indicates any morbid state, auscultation often furnishes signs which indicate that the resolution of the pneumonia is not yet complete.

There are cases also, where, as well as auscultation, percussion no longer affords any information, in consequence of the deep seat of the pneumonia, particularly when the latter exists towards the base, the centre, or the root of the lung.

Percussion, as we have already observed, cannot be employed when the thoracic parietes are painful, when they are infiltrated, or when they are covered with a blister. In these different cases auscultation supplies it with advantage. The same thing happens also with persons whose chest is more or less deformed.

In several cases of double pneumonia, there is an equal dulness of sound on both sides; and if this dulness is inconsiderable, it may be considered as a natural state. Who does not know, in fact, that the chest is far from having equal sonorousness in all individuals, and that very often in persons otherwise in good health, it yields but a very obscure sound? Auscultation does not expose one to such an error.

When we employ percussion, we should never forget that the liver on the right, and the spleen on the left, occasion a dull sound, which is constant for the first of these viscera, and more common than is supposed for the second.

80. The cough does not present any notable character; it seldom occurs by fits; its intensity and frequency are not always proportioned to the acute nature of the inflammation. At the onset it is dry; but it is soon accompanied by a peculiar expectoration, which must be considered as one of the surest signs of pneumonia.

81. Transparent and red sputa, combining into a gelatinous and trembling mass, so viscid that the vessel which contains them may be turned upside down without their being detached from its sides, such are the prominent traits which do not permit us to confound the expectoration of pneumonia with any other. But how insufficient is not this concise description? The sputa, in fact, are far from presenting this appearance in the different degrees of inflammation of the lung: there are cases where they assume an entirely different disposition; at other times, the pneumonia runs through its different stages without its existence having been in any way announced by the expectoration, which has been all through, either absent or devoid of character.

We shall first set about describing the expectoration, such as it most frequently presents itself during the course of a pneumonia.

At the onset of the disease, where there is already observed some cough and some dyspnœa, a marked febrile disturbance, and a pain more or less acute, the

patient does not yet spit, or else he expectorates merely a little guttural or bronchial mucus mixed with saliva. Then, in the majority of cases, the chest when percussed still yields a clear sound; but already a commencing rale is heard in one of the sides of the chest; according as this rale becomes more marked, the expectoration begins to become characteristic: this usually happens from the second to the third day. The sputa become *bloody*, that is, they consist of a mucus intimately united and combined with blood; it is not merely simple striæ of blood, as in the sputa of catarrh; neither is it pure blood, as in hemoptysis. According to the quantity of blood which they contain, the sputa are either yellow, or of an iron-red colour, or of a marked red. They become at the same time tenacious and viscid; they adhere together so as to form one transparent and homogeneous whole; but however little we incline the vessel containing them, they are still observed to flow from it with considerable ease. Thus, at this period of the disease, the sputa adhere firmly to each other, but they are not yet sufficiently viscid to adhere to the sides of the vessel.

Oftentimes, during the entire course of the pneumonia, the sputa are observed to be such as we have now described them: in this case, the inflammation of the lung does not ordinarily pass the first stage; but frequently too the sputa acquire still greater viscidity; they are no longer detached from the vessel, when it is turned upside down. There should be then cause to apprehend lest the inflammation may be advancing and the pneumonia may reach the second stage. Almost always, in fact, at the same time that the sputa become more viscid, the chest when percussed yields a duller sound, and the murmur of pulmonary expansion is either gone altogether, or is changed into bronchial respiration.

The pneumonia has then attained its most acute form. The sputa remain for some time stationary, then they present themselves with new characters, which differ according as the disease is to terminate in resolution, to prove fatal, or to pass to the chronic state.

When the pneumonia proceeds towards resolution, the quantity of blood contained in the sputa begins to diminish as well as their viscidity. First, the vessel containing them must be shaken with considerable force in order to detach them from it; at a somewhat later period, it is sufficient to incline it a little; they gradually resume the characters which they had in the first stage of the disease, and finally, they once more become those of simple acute catarrh.

We often see patients whose sputa, after having been less viscid and less bloody, reassume from one day to another their original viscidity and deeply reddened colour. That is a certain sign that there is a return of the intensity of the disease, as is proved also by the simultaneous exacerbation of the other symptoms.

Is the resolution of pneumonia particularly favoured, as Cullen said, by the expectoration of a thick, white, or yellowish matter, marked with some filaments of blood, which is excreted in great quantity, without exciting a violent cough? Observation has satisfied us that such an expectoration is by no means necessary to the complete resolution of the disease, and that the latter may terminate very favourably, though the sputa which have lost their viscidity, and which are no longer tinged with blood, remain watery, transparent, colourless, and cease at last to be expectorated without having acquired a greater degree of *coction*, as the ancients used to say.

We should, however, commit a serious error if, after merely inspecting the sputa which have returned to a purely catarrhal state, we should suppose that the pneumonia was perfectly resolved. It often happens, in fact, that the nature of the expectoration seems to announce that complete resolution has taken place; and yet auscultation still detects some crepitous rale. The latter con-

tinues with many patients for a longer or shorter time, after the sputa have ceased to be characteristic.

It is more uncommon to see the pneumonic expectoration continue to appear, when the cessation, or at least the obvious amendment of the other symptoms already seems to announce an almost complete resolution of the inflammation; we shall, however, cite a remarkable instance of it.

A man, fifty-nine years of age, was attacked with a pleuro-pneumonia of the left side. On the third day the sputa were reddened and viscid; the same expectoration on the following days. General and profuse sweat on the seventh. On the eighth an amendment of all the symptoms; continuance of the expectoration. On the tenth day the crepitous rale, which was heard since the commencement of the disease, over all the posterior left side of the chest, was succeeded by the natural respiratory murmur; the dyspnœa no longer existed, skin not hot, pulse scarcely feverish, and still the sputa retain the appearance which they presented since the third day of the disease. They are transparent, deeply reddened, combined into a jelly-like mass, not, however, adhering much to the vessel, such as they are observed in the transition from the first to the second stage of pneumonia, or in the return from the second stage to the first. On the following days, the patient seemed completely convalescent. The expectoration, nevertheless, retains the same character, and becomes not decidedly catarrhal till eight or nine days after the disappearance of all the other symptoms of the pulmonary inflammation.

It is probable that, in this case, a central point of the parenchyma had continued affected with a residue of inflammation, which was indicated solely by the expectoration.

When the pneumonia, instead of being resolved, becomes more and more intense, or has a tendency to terminate in suppuration, the expectoration presents new characters which it is important to know.

In the majority of cases the expectoration becomes at first difficult and scanty, then is suppressed altogether. But in some, and that is the most ordinary case, the secretion of the matter of the sputa continues to go on; their excretion alone is impossible, either on account of their great viscidity, or by reason of the debility of the patient. They accumulate in the bronchi, trachea, and larynx, obstruct the passages, and death by asphyxia is the frequent result.

In other patients, the secretion of the matter of the sputa ceases in a manner more or less abrupt. The state of the bronchial mucous membrane may then be compared to that of an ulcer, whose surface, after having been the seat of a profuse suppuration, becomes all at once dried up.

The numerous diseases which so often complicate inflammation of the lung, are one of the frequent causes which diminish or suspend the secretion of which the mucous membrane of the bronchi is the seat. Purgatives given in great quantity at the commencement of the disease, also produce, according to Baglivi, the suppression of the expectoration. Morgagni considers unseasonable bleedings, particularly when employed in the case of aged persons, as calculated to produce the same effect. He says on this subject — *Sunt plures medici qui ægros ob id interimunt, quia nesciunt ipsi quiescere.* Sydenham also states, that bloodletting too often repeated suppresses the expectoration, whilst if employed with more caution, it often serves to re-establish it. In the eyes of the physician who, faithful to those principles, had recourse to venesection with prudent discernment, the taking of a certain quantity of blood is often the best expectorant: *Optimum in pulmonum inflammationibus expectorans remedium venæsectio prudenter administrata habenda est.* — (Frank.)

When it was believed that pneumonia, caused by morbific matter, settled on the lung, could not be resolved but by means of this matter being evacuated by the sputa, persons supposed, as soon as they saw the sputa suppressed, that

the morbific matter remained in the lung, the destruction of which it gradually effected, unless that by means of a happy metastasis it was discharged from the system with the stools, urine, or sweat. Such are the ideas which reigned for a long time in the schools, but which are now no longer admitted, because the existence of this morbific matter is not proved by any fact, and the danger of suppressing the sputa is very easily explained without admitting it. Let the inflammation of the pulmonary parenchyma be exasperated under the influence of any cause whatever, the simultaneous inflammation, with which the bronchial mucous membrane is affected, is sympathetically increased ; and, as in all inflammations of mucous membranes carried to a very high degree, all secretion is suspended in it. The exacerbation of the inflammation then causes both the severe symptoms which appear, and the suppression of the expectoration.

We, however, see some patients labouring under pneumonia in the most intense degree, suddenly cease to expectorate, without any serious mischief immediately occurring. (See case 23.) In such case we must have regard to the aggregate of the other symptoms, and be cautious of giving any prognosis whatever, from the mere circumstance of the suppression of the sputa.

In other patients labouring under a fatal attack of the disease, the sputa are not suppressed, they only change their appearance. Several of these patients expectorate in small quantity, during the last twenty-four hours of their life, some opaque sputa of a dirty reddish grey colour ; there is the greatest resemblance between this species of sputa, and those often expectorated by phthisical patients a little before death.

Finally, in some rare cases, the expectoration continues to appear up to the last moment of life, in the same abundance and the same characters as if the inflammation was to terminate in resolution. We saw a striking instance of it in an old man who was brought to the La Charité, presenting all the symptoms of very intense pneumonia. He died on the seventh day. During all the time of his stay in the hospital, his sputa were transparent, combined in a jelly-like mass, adhering strongly to the vessel, and remarkable for their saffron colour. Two hours before death, he still expectorated a great quantity of these sputa. We found the left lung in a state of red hepatisation, from its summit to its base : the bronchi, examined in their large trunks, and as far as their smallest ramifications, were intensely red.

Is the termination of pneumonia by suppuration announced by a peculiar expectoration? Authors have said nothing on this subject. Among the individuals who died of acute inflammation, in whom we found the lung in a state of grey hepatisation, some ceased to expectorate in the latter period of their illness; others expectorated greyish, inodorous sputa, flowing together in one mass, and truly purulent; in others the expectoration remained such as it appears in the case of red hepatisation. Finally, in a certain number of patients, we have seen the sputa in this third stage lose their jelly-like appearance, their great viscidity and their reddened appearance, and to consist thenceforth merely of a liquid having the consistence of gum water, of a more or less deep brownish red, sometimes even altogether black, bearing a considerable resemblance to liquorice-juice, or prune-juice. Oftentimes the mere presence of this kind of expectoration has induced us to announce the existence of the third degree of pneumonia, and the autopsy almost always justified our diagnosis. (See cases 13, 14, 15, 16.)

However, we must not consider this kind of sign as infallible, the most general rules have their exceptions, and sometimes we have observed the prune-juice sputa just described, in individuals whose lungs were only in the state of red hepatisation (cases 24, 25); we have even met them in a case where the pneumonia, being rather slight, did not appear to have passed the first stage, and had a favourable termination. (Case 26.)

When the pneumonia terminates in gangrene, this termination is announced by the expectoration of a liquid at first greenish, then a dirty grey colour, reddish at intervals, exhaling a fetid odour, like that of the gangrene of external parts. (Cases 42, 43.)

It would still remain for us to speak of the expectoration in the case where the acute pneumonia passes to the chronic state, or in the case of primary chronic pneumonia, but then the sputa present no peculiar character; they are those of pulmonary catarrh, of which they may assume all the shades. Should it happen that the symptoms of chronic pneumonia become exasperated, so that the disease repasses to the acute state, this change is announced by the nature of the expectoration, which reassumes its viscidity, transparence, and red colour.

When a pneumonia complicates an affection of the lung already of long standing, the sputa present variable characters which it is important to know. Sometimes the expectoration which belonged to the previous affection of the lung, such as chronic bronchitis, or tubercles, entirely disappears, and is succeeded by the expectoration which announces inflammation of the pulmonary parenchyma, but often, also, there is observed a mixture of both; their characters are mutually masked, and we can no longer draw any inference from them with respect to the diagnosis or prognosis of the disease. At other times, after the sputa which belong to the pneumonia have appeared alone for a long time, we see the former expectoration reappear towards the decline of the inflammation. Thence a new source of error. One might consider, for instance, as still appertaining to the pneumonia, and even as affecting its crisis, white and opaque sputa, which are altogether foreign to it, and which depend on an old bronchial affection, which, suspended or modified by the pneumonia, returns to its former state the moment the parenchymatous inflammation begins to resolve.

The preceding considerations prove sufficiently how important the attentive study of the nature of the expectoration is in pneumonia, and how it assists in establishing its diagnosis. However, it is not to be supposed that all pneumonias are accompanied by a characteristic expectoration; there are pneumonias, slight or severe, which run through their different periods, and terminate, some in health, others in death, and which never presented anything but the sputa of simple bronchitis. (Cases 27, 28, 29, 30.) The complete absence of characteristic expectoration is observed particularly in the cases of intercurrent pneumonias. (Case 40.)

Shall we mention here that the absence of all expectoration during the course of a pneumonia has been considered as dangerous an omen as its suppression? Thus Cullen thought that it rarely happened that a pneumonia without expectoration terminated in resolution. Frank, whilst he considers with Cullen the absence of the sputa as a very bad symptom in pneumonia, avows, however, that he has seen a considerable number of patients recover perfectly, though they never had expectoration to any amount; but he says that he observed in them a sediment deposited from the urine, and very copious sweats, which, according to him, advantageously supplied the evacuation which should have taken place by the sputa. We have not observed anything of the kind.

Does the colour of the sputa of pneumonia depend uniformly on the presence of blood? are they not also frequently coloured with bile? We are far from wishing to deny the latter cause of colour. We have given a case of it (Case 38); but we consider it as more rare than is generally thought, and we think we may generally attribute the varied colour of the sputa to the variable quantity of blood which they contain. If, in fact, we mix with pure water, rendered viscid by means of mucilage, a little blood, the proportion of which is gradually increased, we see it successively become tinged with a deeper and deeper yellow, then with a greenish yellow, then with a yellow which is confounded

with red, whence the iron-red colour, then, in fine, with an intense red. We also find in the serum of the blood, separated from the crassamentum, the different shades of yellow, green, and red, according to the greater or less colouring matter it has retained. The pneumonic sputa are very generally yellow at the onset of the disease; they then acquire a well-marked red tint; then, according as the inflammation lessens, they are observed again to become yellow or greenish. Will it be admitted that the bile and blood mutually succeed each other, whilst the alternating change of colour is very naturally accounted for by considering it as owing to the variable quantity of blood contained in the expectoration?

82. The different functions of organic and animal life undergo, in acute pneumonia, greater or less disturbance.

At the commencement of the disease the face is ordinarily red; but we have not observed, as has been frequently stated, that the cheek of the side of the lung affected was redder than the other. Anatomy also refutes such an idea. The higher colour of the cheek of the affected side is manifested only when the patient has lain for some time on this side, and then the greater redness of the cheek should be considered as a purely mechanical phenomenon. The redness of the cheeks continues as long as there is a strong reaction. If the dyspnœa becomes considerable, the countenance presents a livid tint, which increases with the difficulty of the respiration. When the lung begins to be infiltrated with pus, a characteristic paleness, a tint sometimes similar to that of cancerous affections, is usually diffused over the entire face. This appearance of the face is often so well marked, that it has served us, in some cases, more than any other sign, to diagnose the third stage of pneumonia.

83. Delirium manifests itself rather frequently during the course of pneumonia. Sometimes appearing only at intervals, and particularly during the night, it is a symptom not at all important. Sometimes, on the contrary, it is continued, and is accompanied by other nervous phenomena. In this case it may be produced by a real meningitis; but most frequently no other lesion is found than a certain quantity of limpid serum effused into the ventricles, and particularly at the base of the cranium. The delirium, owing to this cause, manifests itself principally when the respiration is very much embarrassed; it seems that here, as in aneurismatic patients, as in all cases where there is a commencement of asphyxia, the serous cerebral effusion arises from the purely mechanical difficulty experienced by the venous blood in its return from the encephalon to the lungs through the right side of the heart, which is gorged, and as it were obstructed with blood. At other times again, we find no appreciable lesion either in the encephalon or its appendages to account for the delirium of pneumonias.

84. The mode of lying down in pneumonia has this long time engaged the attention of practitioners; constant decubitus on the affected side has been given as one of the characteristic signs of inflammation of the lung. Now nothing is less true. At the onset of pneumonia, as in its course, there is scarcely one patient in fifteen who lies in this way; all the rest constantly lie on the back. It is not in pneumonia, but in certain pleuritic effusions, that this decubitus on the affected side is observed, as we shall prove another time.

85. The state of the pulse is very variable; its most usual character is that of being frequent and large. When the inflammation is very intense, it is sometimes remarkably small; this smallness disappears after copious bloodletting. In other patients there exists a real weakness of the pulse, which is increased by bleeding. As much as numerous bleedings are useful in the first stage, in the same way would they be injurious in the second. The sudden suppression of the sputa, the increase of the dyspnœa, a prostration rapidly fatal, have been more than once the result of these unreasonable bleedings. It is then that

active revulsives should be employed. It is often very difficult to establish, *à priori*, and from the mere consideration of the symptoms, the distinction between the pulse which is really weak, and that which is only apparently so. The effects of bleeding may assist considerably in establishing this distinction.

Sometimes, on the contrary, after copious bleedings, and when every thing announces that the inflammation is lessening, the pulse loses nothing of its strength and hardness; but in that case very often, and this is observable in old people particularly, the hardness of the pulse does not indicate the severity of the inflammation or the strength of general reaction; it is connected with hypertrophy of the heart, confined to the left ventricle, the parietes of which are thickened at the expense of the cavity. It is easily seen how important the knowledge of such a circumstance is with respect to treatment.

It rarely happens that the pulse presents an intermission or well marked irregularity, even in the most alarming cases, unless there be a complication of organic lesion of the heart.

Great frequency of the pulse announces danger in this disease. It seldom happens that recovery takes place when the pulse exceeds one hundred and thirty. The frequency of the arterial pulsations is always in a direct ratio with the frequency of the inspiratory movements; however, in the last periods of life it is often observed that the pulse loses its frequency and seems to have returned to its natural state, though the respiration becomes more and more accelerated. This is invariably a fatal sign.

When the different rational symptoms of pneumonia have disappeared, when there is no longer either dyspnœa, expectoration, cough, nor fever, properly so called, it sometimes happens that the pulse remains more frequent then in its natural state. This unusual frequency, without there being at the same time either a rising of the pulse, or heat of the skin, should not be overlooked; it should excite apprehension that a residue of the inflammatory process still exists in the lungs, and auscultation generally affords a certainty of it. At other times, on the contrary, in consequence, no doubt, of the different activity of sympathies in different individuals, the circulation ceases to be disturbed when there is still a little dyspnœa and cough, and when auscultation announces that the inflammation is not yet completely resolved.

86. One of the most constant phenomena observed in pneumonia, is the buffed state of the blood. We have carefully noted, in most of the cases, the differences presented by the buffy coat with respect to its consistence, thickness, colour, and form. We have been able to see in some cases the evident relation which existed between the presence of this coat, and the existence of the pulmonary inflammation at the time. Accordingly, some persons were bled before they had as yet presented any sign of pneumonia, or after the cessation of the latter. Their blood was not then coated. These same persons were also bled during the course of the pneumonia, and then their blood was coated.

87. The digestive functions, except in cases of complication, have not presented any phenomenon worthy of notice, except whiteness of the tongue, anorexia, and some thirst. These phenomena are observed in the most serious diseases, as well as in the slightest; they demonstrate the close connexions which unite the digestive functions to those of the other functions.

We should here treat of the state of the different secreted fluids, and particularly of the sweat and urine; but shall reserve that matter for another opportunity.

88. We have now passed in review the different symptoms of pneumonia; but in order to appreciate them the better, we have considered them separately; let us now observe how they appear, combine, and succeed each other in the different phases of the disease. We shall first state the most common cases, and then note the exceptions.

Pain is ordinarily the first symptom which appears, preceded or not by

shivering; at the same time the respiration is embarrassed, the patient coughs without expectorating; auscultation, employed from this first period, most frequently detects a little crepitous rale, which is not yet loud enough entirely to mask the respiratory murmur. The chest, when percussed, still sounds well; there is a more or less marked febrile disturbance. This group of symptoms constitutes the first period of the disease. From the second to the third day new symptoms appear; the expectoration, till then either none or purely catarrhal, becomes characteristic; it is at first but slightly viscid, and differently coloured, according to the variable quantity of the blood which it contains. The crepitous rale, now more intense, masks still more the respiratory murmur; the sonorousness of the thoracic parietes begins to become less on the side where the crepitous rale and pain are found to exist; the latter is usually less acute than at the commencement. The dyspnœa increases; it is easily recognised by the short, frequent inspirations made by the patient, though very often he positively asserts that he feels no oppression. If the pain is acute, decubitus on the affected side is impossible; neither does the patient lie on the healthy side, because he then breathes with more difficulty; he almost always lies on his back. The fever continues with numberless shades with respect to the characters of the pulse, temperature of the skin, its degree of humidity or dryness.

In this state, the pneumonia, having now attained a considerably acute form, is still, however, only in the first stage. Often then it remains stationary for a longer or shorter time, then it retrogrades; the dyspnœa diminishes; the slight dulness of sound disappears; the crepitous rale is gradually succeeded by the natural respiratory murmur; the sputa again become those of simple bronchitis; the febrile disturbance is at first less intense, and then it ceases altogether.

At other times, instead of retrograding towards resolution, the pneumonia becomes more severe, though it has not yet passed the first stage. This increase in severity is the result, either of the propagation of the inflammatory engorgement to a greater extent of the pulmonary parenchyma, or else of an inexplicable idiosyncrasy; the dyspnœa goes on increasing, and death may supervene, the pneumonia not yet having passed beyond the first stage.

In the majority of cases, however, this is not so. If the inflammatory engorgement is not resolved, if the symptoms announcing it become more severe, there is then reason to dread the invasion of the second stage. We may be certain of the existence of this latter, when the following phenomena are observed. The breathing becomes more and more embarrassed, short and hurried; the power of speaking is interfered with; the patient can then only pronounce some half-broken words with a panting voice. The sputa become so viscid that they can no longer be detached from the vessel. The sound of the chest, on the side affected, is decidedly dull; at first there is still heard a little crepitous rale, without the mixture of any respiratory murmur; then this rale disappears, and in applying the ear to the thoracic parietes, we either no longer perceive anything whatever, or else we hear, where the sound is dull, the bronchial respiration, which is almost invariably accompanied by a peculiar resonance of the voice. The decubitus on the back still continues. The pulse, very frequent, remains strong and full, or else it exhibits a degree of weakness which is sometimes real, most frequently apparent. In this stage the prognosis is always very unfavourable; the patients die rapidly in a state of asphyxia.

However, in this stage resolution may still take place. Then the dulness of the sound diminishes, the bronchial respiration disappears; we again hear some crepitous rale, at first alone, but afterwards blended with the natural respiratory murmur, which in its turn is also heard alone. The sputa repass to the catar-

rhal state ; at the same time the dyspnœa and fever diminish, and then cease altogether. (Cases 5, 6, 7.)

It is often impossible to distinguish, from the nature of the symptoms, this second stage from the third. This latter has not really any other characteristic sign but the watery and brownish expectoration, more or less like the prune-juice already described ; but this sign is not infallible ; for on the one hand this expectoration may show itself without there being the grey hepatisation (Cases 24, 25, 26), and on the other hand, this latter may exist without such expectoration (Cases 27, 31, 38, 39). The extreme paleness of the face, its cadaveric appearance several days before death, can afford only mere probabilities.

Neither is it from the period of the disease that we can announce the existence of the second or third stage ; for sometimes from the fifth day the lung is in a state of suppuration ; sometimes after fifteen or twenty days, it is as yet only in the state of red hepatisation.

If it happened that the pus scattered through the pulmonary parenchyma were combined into a focus, and that the abscess thence resulting should communicate with the bronchi, auscultation would then probably detect gurgling and pectoriloquy, as in the case of tuberculous cavities.

Once the pneumonia has attained the third stage, is it still capable of cure ? We possess no fact which will afford a solution of the question. Can it even be solved in the present state of science ? In all the cases of cure, what sign can afford a certainty that there really was suppuration of the lung ? Some have published, no doubt, cases of abscess of the lung after pneumonia, which terminated in recovery ; but the signs derived from auscultation, which have been regarded in cases of this kind as announcing the existence of pulmonary abscess, and which afterwards disappeared according as the cure proceeded, are precisely those which we regard from numerous verifications made on the dead body, as characterising mere red or grey hepatisation, bronchial respiration, and modification of the voice coinciding with it. We therefore think that in the cases of this kind recently published, the signs of hepatisation have been referred exclusively to an abscess.

Termination by gangrene is announced by the fetor of the breath, and the characteristic sputa already described (Cases 42, 43, 44).

89. The resolution of pneumonia, as of all diseases, may take place with or without crises ; that is to say, be or not be accompanied by phenomena whose appearance coincides in a marked manner with the slow or sudden amelioration of the symptoms. Among these critical phenomena, the most common and most evident is increase of the cutaneous transpiration. In this point of view several kinds of sweats may be distinguished in pneumonia. Some exist during the entire course of the disease ; the continual process then going on in the skin seems to be a favourable circumstance, which renders the disease less severe, and facilitates its resolution ; but this kind of sweat is not properly a critical sweat ; it is symptomatic. (Case 5.)

With some exceptions it may be laid down as a general principle, that habitual moisture of the skin, in pneumonia, is a favourable sign. It often happens that in this case, and without any other perceptible phenomenon occurring, the pneumonia gradually terminates by resolution ; but at other times, the sweat appears on a sudden in greater quantity, if it already existed, or else it is suddenly established, if the skin had till then remained dry ; and, in these two cases, we observe the symptoms of the inflammation amend rapidly ; oftentimes the patients in such cases pass, in a few hours, from a very alarming state to convalescence. (Cases 1, 3, 6.)

Will it be said that here the sweat is but a mere effect ? But in this case, why before the appearance of the critical phenomenon should we most frequently

observe a temporary exasperation of the symptoms? Should not the contrary happen? Should not the amendment precede the sweat, and not follow it?

There is no disease in which the existence of critical sweats seems more perfectly demonstrated than in pneumonia: *Ut plurimum per sudores terminatur peripneumonia.* — (Frank.) With respect to the explanation of the fact, it seems to us not easy to give a very accurate one. Will it be said that the sweat cures the pneumonia by the displacement of the *irritation?* But, in order that one irritation may cure another, it should be greater than it; now, is the slight irritation of the skin during the process of sweating capable of displacing the intense irritation which exists in the inflamed lung? A violent erysipelas would scarcely produce such an effect.

Pneumonia terminates also by other critical phenomena. Thus we have reckoned among the number of crises, diarrhœa and hemorrhage, which we have occasionally seen to occur. Authors mention but a very small number of well-attested examples of this kind. A remarkable case of critical hematuria has been recorded by Dr. Latour of Orleans.

A young man, a baker, on leaving his work all in a sweat, exposed himself to a very cold air. Immediately there occurred a shivering and lassitude, pulse strong and hard; pain of side very acute, bloody sputa. On the next day two bleedings; some ease. On the next day, slight gastric complication; a grain of tartar emetic. In the evening an exacerbation of the symptoms of the preceding day; intolerable pain of side. A third bleeding, which gave some relief. On the fourth day a pain of side still more violent. Leeches, blister; towards evening, intense paroxysm; disturbed night, some delirium. On the fifth day, acute and pulsating pain in the lumbar region, suppression of urine; towards evening pain of the loins very severe; which seemed to be relieved by a bath; it soon became more severe. At last, the patient, in a state bordering on delirium, felt a desire to pass his urine, and discharged by the urethra, at one time, nearly half a pint of intensely red blood without any admixture. From thenceforward the symptoms became mild, and the disease declined. On the sixth day, the natural excretion of urine returned, and convalescence was rapid.

It has been stated that pneumonia was often critically terminated by abscesses principally seated in the upper extremities; we never met any such thing.

Finally, the expectoration also has been placed among the number of the crises of pneumonia. Boerhaave and his celebrated commentator Van Swieten, regarding pneumonia as the result of sanguineous obstruction of the arteries of the lung, thought that the blood which obstructed the small vessels, where it underwent a modification which changed it into morbific matter, passed, at the end of a longer or shorter time, from those vessels into the bronchi: if this passage could not take place, it was carried into the torrent of the circulation, and went from the system with the urine, stools, sweat, &c. Thence those different crises, among which the expectoration must be considered as the most frequent and most salutary. But such ideas can no longer be admitted: the bloody sputa of pneumonia should no more be considered as a crisis of this disease, than the pus formed on the surface of the pleura and peritoneum, when these membranes are inflamed, can be considered as critically terminating pleuritis or peritonitis.

90. Convalescence from pneumonia is usually short, when it is real. From the moment the pulmonary inflammation has ceased, the strength returns with incredible facility, notwithstanding the number and abundance of the bleedings which have been employed; but false convalescences are to be dreaded in this more, perhaps, than any other disease. In many patients a residue of pulmonary inflammation, announced by auscultation, continues for a longer or shorter time after the different rational symptoms of pneumonia seem to have disappeared; however, it rarely happens that, in this case, the attentive examination of the different functions will not lead one to suspect this residue of inflammation.

Thus the patient no longer feels any dyspnœa, his inspiratory movements seem natural, power of speaking unimpaired; but if he make any considerable exertion, if he wish to take a deep inspiration, if he keep up a long conversation, the attentive observer soon recognises that the respiration becomes short and accelerated, and that, according to a vulgar saying, the patient is easily put out of breath. After meals, this embarrassment in the breathing also manifests itself. There is not, properly speaking, fever; but the pulse retains a little of its frequency, and in the evening the patient feels some lassitude and illness. If the chest be then examined, a more or less marked crepitous rale is found, where the pneumonia was previously recognised. The aggregate of the symptoms now described may be more or less marked; if they are but little so, they will easily escape investigation; if auscultation is not employed, the patient will be considered as perfectly cured. It is unnecessary to say that from this error of diagnosis, either a speedy relapse, or a slow disorganization of the pulmonary parenchyma, must almost necessarily result. One of the most valuable advantages of auscultation is to prevent the possibility of such fatal mistakes; with such admirable precision does auscultation point out in this case the real state of the lung.

We have still to point out another case, and one that is unfortunately too frequent, of false convalescences after pneumonia; this cause resides in the rapid development of pulmonary tubercles. It seems, in this case, that, existing previous to the inflammation, they receive from the latter a fatal impulse which favours both their increase and their softening. Often then, at the same time that the tubercles are developed, the inflammation of the parenchyma ceases altogether, so that the chest resounds perfectly well, and the respiration is found to be clear in every part, but still louder than natural: still the strength, far from being re-established, diminishes every day; the patient wastes away, he coughs and breathes with difficulty; every evening he has some fever. These symptoms become more distinctly marked, and in a little time there is no longer any doubt of the existence of pulmonary phthisis, the advance of which is often very rapid — (Case 34). Morton very well described this species of phthisis, which he called *phthisis a peripneumonia.*

Convalescence from pneumonia is not only shackled by the two preceding causes; sometimes the lung remains engorged with blood or serum. This engorgement is not inflammatory, for it does not yield to antiphlogistics, and is, on the contrary, removed by tonics; it is a sort of passive infiltration which succeeds the inflammation. Thus we have more than once seen, in persons debilitated by any cause, œdema follow erysipelas of the lower extremities; thus again, we often observe, after enteritis, serous infiltration of the submucous cellular tissue, &c. The crepitous rale, a slight dyspnœa, absence of fever, a state of general languor, accompany this sort of pulmonary engorgement. Such signs are no doubt insufficient to distinguish it from genuine inflammation, and the treatment is then the touchstone. Here, as in many other cases, it is only by feeling our way, as it were, that we can ever establish a good diagnosis, and consequently a suitable treatment. Passive engorgement of the lungs comes on not only after pneumonia, it supervenes also towards the termination of several other affections of long continuance, during the course of which decubitus on the back has invariably taken place; more than once have we seen it yield to the employment of polygala and kermes, after it had resisted the long continued use of demulcents, and even bloodletting. Gentle exercise, good air, and a somewhat nutritive diet, must also hasten its resolution.

91. It is a great question, frequently debated from the time of Hippocrates down to our own time, whether diseases have a natural tendency to terminate at the end of a certain number of fixed days called *critical days.* Such a question cannot be decided *a priori;* it is for facts alone to decide. Pneumonia is

one of the diseases wherein it seems easier to solve the question, because, on the one hand, the precise time of its onset is most frequently very well marked, and because, on the other hand, the period of its termination is likewise equally well marked. We may observe, that in an hospital it is difficult always exactly to know how and when the disease commenced; so that it is rather in private practice that proper researches can be made regarding the period of diseases and their critical days. The following is a summary of our observations regarding the duration of pneumonia in one hundred and twelve cases.

Number of Pneumonias.	Duration.
3	4 days.
2	5 do.
6	6 do.
23	7 do.
2	8 do.
4	9 do.
11	10 do.
13	11 do.
1	12 do.
2	13 do.
11	14 do.
2	15 do.
2	16 do.
9	20 do.
1	27 do.
1	42 do.

Of the pneumonias, the precise period of whose termination could not be determined,

Number.	Duration.
3	5 to 7 days.
12	7 to 14 do.
7	14 to 20 do.
4	20 to 30 do.

The result of this summary is, that the days on which the greatest number of pneumonias were observed to terminate, are the seventh, eleventh, fourteenth, and twentieth.

Of these one hundred and twelve pneumonias, only one lasted more than thirty days, and might be considered as a chronic affection. Authors do not seem to have called sufficient attention to the extreme rarity of chronic pneumonias not complicated with tubercles or melanoses. Within the last five years, we have seen but very few instances of red or grey hepatisation of the lung of a longer date than two months. Yet how does it happen that chronic pneumonia is looked on as rather a common disease? Probably because pleuritic effusions have been frequently confounded with inflammation of the pulmonary parenchyma. However, a well-marked instance of chronic pneumonia has been recorded by Bayle in his *Researches on Pulmonary Phthisis.* (Case 46.) The disease had lasted from three to four months; it commenced imperceptibly, and had been taken for phthisis. The right lung was found in a state of red hepatisation.

92. If it be exceedingly rare to find chronic pneumonia without complication, it is, on the contrary, very common to find the portions of lung surrounding softened tubercles in a state of chronic inflammation. Can we say that, in this case, the pneumonia preceded the formation of tubercles? We do not think it.

In fact, in the first stage of phthisis, when the tubercles are still crude and few in number, the chest is still perfectly sonorous, and the respiration is heard in every part perfectly clear: this is the most general case. Therefore the pulmonary parenchyma is not inflamed at this period. If the patients die, the autopsy also proves the absence of this inflammation. At a later period, when the tubercles increase and begin to soften, some crepitous rale is often heard in several parts, without there yet being any dulness of sound. If death occur at this period, the pulmonary tissue around the tuberculous masses is found very much engorged, and oftentimes softened. (First stage and commencement of the second.) Finally, at a period still more advanced, when there is still more considerable softening of the tubercles, and cavities are formed, the sound is most frequently dull around the parts where auscultation detects the existence of tuberculous cavities, and there also the lung is found after death, hard, impervious to air, greyish, infiltrated with pus, in a word, such as it is observed in the third stage of pneumonia. We do not confound this purulent infiltration with the tuberculous infiltration so well described by Laennec.

These facts seem to us to prove beyond a doubt, that here the chronic pneumonia, consecutive to the formation of tubercles, results from the continual irritation which the latter keep up in the pulmonary parenchyma surrounding them. It is very far from being equally easy to prove that tubercles are not the product of an antecedent bronchitis: but this is not the place to discuss that question.*

No characteristic expectoration, no other sign but those furnished by auscultation and percussion, announce the existence of these consecutive chronic pneumonias. They are one of the causes which hasten the death of phthisical patients, either by the mere fact of their existence, or because they favour the development and softening of tubercles. They may be combated with advantage, particularly in their first stage, by a judicious antiphlogistic treatment. Bloodletting is indicated in the course of phthisis much more to stop these intercurrent pneumonias, than directly to combat the tuberculous affection over which it seems to possess but very questionable influence.

93. After having considered pneumonia, such as it presents itself in the majority of cases, let us pass rapidly in review its numerous varieties; it is very important to know them all thoroughly.

Of these varieties some regard the seat. Thus, pneumonia may attack the two lungs, or only one: confined to a single lung, it may exist only in some circumscribed portions of it, be scattered in a manner over several isolated points, and in this way constitute a greater or less number of small partial inflammations. In the case of double pneumonia, the equal diminution of the sound on both sides, renders the information afforded by percussion either null and void, or unsafe and not to be depended on; it is unnecessary to say that then the prognosis becomes much more unfavourable. In the case of partial pneumonia, in consequence of the deep and circumscribed seat of the inflammation, the expectoration alone often reveals the real nature of the disease, and distinguishes it from simple acute bronchitis.

Other very important varieties regard the absence of one or more symptoms,

* Whilst we acknowledge, that in a great number of cases the pneumonia arises only consecutively to tubercles, and therefore cannot be considered as their cause, we must also admit, that there are other cases where the chronic pneumonia has evidently preceded the formation of tubercles. This is what seems to take place, when, in the midst of a lung almost entirely hepatised, some tubercles are found scattered in the nascent state. They are too small and too few in number to have been able to produce hepatisation of an entire lung; it is, on the contrary, this hepatisation which very probably has at least favoured their development. For a more ample discussion of this point consult my *Pathological Anatomy*.

whence latent pneumonia results. It is sufficiently proved that intense inflammation of the pulmonary parenchyma may exist without being announced by dyspnœa, cough, or sputa. Sometimes, too, it may happen that at the same time these signs are wanting, auscultation and percussion also cease to disclose the real state of the lung (Case 31): the diagnosis then becomes impossible. We have already remarked, that these latent pneumonias, which are but seldom primary, supervene particularly when an inflammation of the lung complicates another disease.

The different ages of persons affected with pneumonia introduce into the symptoms shades, which are striking enough to constitute two remarkable varieties of this inflammation, namely, the pneumonia of children, and the pneumonia of old persons.

We comprise under the title of the *pneumonia of children*, that which attacks them from birth to the age of ten. During all this period, pneumonia is very frequent, and it is one of the most powerful causes of the mortality of children: it is then of great importance that it should be well understood. The symptoms announcing it are frequently very obscure. In fact, in children there is no expectoration; if the pneumonia is only in the first stage, and not extensive, percussion often detects no difference of sound in the different points of the chest. There is hardly ever observed so great a dulness as in the adult; but often by comparing attentively the sound yielded on both sides, we do not find an absolutely dull sound, but a less sonorousness on the side where the pneumonia exists. On this same side, auscultation detects some crepitous rale, with the same modifications which it presents in the adult. It is extremely rare that this rale entirely ceases to be heard; but it is confounded with the mucous rale more frequently than in the adult. There are also frequent cases where, in consequence of the seat of the pneumonia, the respiration retains all its clearness; in this case, the cough, dyspnœa, and fever, are no longer sufficient to characterise the pneumonia; the dyspnœa itself, too, may not exist, as in several cases of the pneumonia of adults.

However, the diagnosis is here so much the more important to be established, as it exercises the greatest influence on the treatment. In more than one case of pneumonia it has happened, that the cough and dyspnœa have been considered as the purely mechanical result of the accumulation of mucus in the bronchi; the only effort made was to unload the latter by the administration of emetics and different expectorants, and the employment of bloodletting was neglected, which, by destroying the cause, might have put a stop to the effect. It is, however, but fair to say, that after bleeding children are oftentimes relieved by the administration of a mild vomit, which in their case supplies the expectoration very advantageously. But we should be cautious not to substitute this secondary means for the primary and principal.

Post-mortem examination seldom shows in children a genuine red or grey hepatisation of the lungs; most frequently there is observed simple engorgement, with or without softening of the tissue. It is this same state which we have already alluded to in adults, and which indicates, as has been already said, the passage from the first to the second stage. It is in children that the small partial inflammations which we have referred to are most frequently met; these inflammations occupy a number of points separated by a very healthy tissue, each of which often hardly equals the size of a nut. Thence, also, the frequent insufficiency of auscultation and percussion in a great number of the pleuro-pneumonias of children: the inflammation being, in some measure, scattered in them over a great number of points, it follows that it is only by isolated points that the sonorousness will be diminished, and the respiratory murmur modified.

The pneumonia of old persons often presents itself such as it is observed in

the middle period of life; but it produces in general a much more rapid prostration; it seems also that in them the pulmonary inflammation arrives more easily and more quickly at the third stage. It often complicates the chronic bronchitis with which many old persons are affected: there is then observed great dyspnœa, which particularly engages attention, and from this leading phenomenon the name of suffocating catarrh is given to the disease. In a great number of cases of this kind, there is no expectoration, and the mucus accumulated in great quantity in the bronchi produces a mucous rale, which prevents auscultation from throwing any light on the state of the pulmonary parenchyma.

Here, as in the pneumonia of children, the different means by which we endeavour to favour the expectoration may be useful, but they should not form the basis of the treatment. Notwithstanding the great age and debility of the patients, we should not hesitate boldly to employ bloodletting. If, however, no relief follows the first bleeding, performed either with the lancet or with leeches, if after their use the prostration increases, we must immediately give up their employment, and have recourse to revulsives, applied alternately to the chest and extremities.

Pneumonia still presents several varieties with respect to its complications, such as typhoid fevers, pleuritis with effusion, pericarditis, arachnitis, gastro-enteritis, pulmonary tubercles, aneurism of the heart, &c. The symptoms of these different diseases and those of pneumonia are masked and complicated; great clinical adroitness is then required to separate in this aggregate of morbid phenomena that which belongs to lesion of such or such an organ. We cannot say anything general on this point, and refer to the cases contained in Article 4.

False pneumonia (*peripneumonia notha vel spuria*) has been described as a variety of inflammation of the lung. Under this head must be ranked several affections which simulate inflammation of the pulmonary parenchyma in several of their symptoms, but which differ essentially from it in the nature of the organic lesion. Thus an acute bronchitis, accompanied with fever, dyspnœa and viscid sputa, may impose on one for a pneumonia; but in this case, the chest remains sonorous, nothing is heard but some bronchial rale, and the sputa, though often presenting striæ of blood, are not uniformly combined with this liquid. There are cases, however, where the acute bronchitis seems to be confounded with commencing inflammation of the parenchyma, and the precise distinctions between these two diseases then becomes very difficult. Fortunately such a distinction is of very little importance in practice; for a very acute general bronchitis, and a pneumonia in the first stage, as yet circumscribed, are attended with nearly equal danger, and present the same indications of treatment.

Another sort of false pneumonia is that which results from the sanguineous congestion of which the lungs are frequently the seat at the onset of the eruptive fevers (small-pox, measles, scarlet fever). The patients then experience greater or less dyspnœa, which ceases as it were by enchantment, at the same time that the eruption shows itself. (Case 41.) Is it on this simple sanguineous congestion that the slight dulness of the chest depends, which had been remarked by Avenbrugger and Corvisart, in persons who were in the onset of an eruptive fever?

During the course and at the termination of several chronic diseases, the lungs present, more especially posteriorly, a serous or sanguineous congestion, which differs from the preceding in its appearing to be essentially passive. One might say that in this case the blood engorges the lungs, as in scorbutic persons it engorges the tissue of the gums, the skin, the different mucous membranes, as in others it fills and swells the spleen.

Finally, among the number of pseudo-pneumonias we think it right to place

the group of symptoms described by Stoll, under the title of *bilious pneumonia.* These symptoms, in fact, do not seem to us by any means to characterise a genuine inflammation of the lung. Loss of appetite, bitter taste in the mouth were observed, says Stoll, as precursory phenomena. At the end of a longer or shorter time wandering shiverings supervened, followed by heat, oppression, and a pain seated behind the sternum, or in one of the sides ; this pain was not increased either by cough, or by inspiration. Decubitus on either side ; hypochondria tense or painful ; the patient had a sensation of weight at the epigastrium, which was painful to the touch. They had bitter eructations, tongue white, green, or yellow, little thirst, nausea and sometimes vomiting, constipation or bilious diarrhœa ; the sputa were thick, white, or greenish, fever variable. Stoll dispersed this group of symptoms by means of one or two vomits. It is our opinion that this pneumonia, as he called it, was nothing but pulmonary catarrh with gastric or intestinal disturbance. Thence the utility of evacuants. We have more than once met such a state, and we have seen it yield to the same mode of treatment. But Stoll's ideas, on this matter, have not been always thus interpreted. The name of bilious pneumonia has often been given to a genuine inflammation of the lungs, because some symptoms of gastric disturbance were observed, and especially because the sputa presented a yellow tint, which was attributed to bile, and which is evidently nothing but the result of the intimate mixture of blood and mucus in certain proportions. In this case the employment of evacuants should be but very secondary, and it is by large bleedings that we should combat the pulmonary inflammation, however marked the complication called bilious may be. Several patients have presented to us, combined genuine pneumonia, this bilious complication announced by the yellow tint of the face, bitterness of the mouth, thick coating of the tongue, nausea, eructations, weight in the epigastrium, &c. The emetic diminished in some the disturbance of the digestive functions ; it never removed the symptoms of the pneumonia, which yielded only to bloodletting.

94. The prognosis of pneumonia, generally unfavourable, varies according to the degree of the inflammation, its extent, its seat, the nature of the symptoms, and the complications.

It is not necessary to mention that the first stage is less dangerous than the second, and the second than the third. Several cases have satisfied us that the pulmonary inflammation may still be very well resolved, though a great portion of the lung be in a state of red hepatisation. We do not know an instance which proves the possibility of a cure in the third stage.

A pneumonia in the first stage, but very extensive, is generally as dangerous as a pneumonia in the second stage, but much more circumscribed.

By reason of unaccountable idiosyncrasy, simple engorgement of the lung, occupying but a small portion of this viscus, is sometimes fatal, whilst in another individual, placed in the same circumstances, a red hepatisation, occupying more space, terminates in resolution. Such cases are luckily very rare, and do not destroy the general rules laid down.

Inflammation of the upper lobe is generally more dangerous than that of the lower lobes.

The state of the respiration modifies the prognosis more than any other symptom. A considerable dyspnœa, whatever be the state of the lung, is always an alarming sign. The state of the pulse, on the contrary, can hardly furnish any certain datum regarding the issue of the disease ; its weakness, particularly, is often but apparent. If, however, a weak pulse coincides with considerable difficulty of breathing, and if it does not become more full after the first bleeding, we should infer from this, that the inflammation is very intense, and consequently affords a very alarming prognosis.

Great viscidity of the sputa, their deeply reddened tint announces intensity

of the inflammation; their return to the catarrhal state indicates that resolution is going on; watery and brownish sputa, more or less resembling prune-juice, should incline us to suspect suppuration of the lung, and are in general a bad sign. The same may be said of greyish and purulent sputa; their difficult excretion, their retention in the trachea and bronchi, announce a fatal termination; their suppression, owing to the cessation of their secretion, is less unfavourable; it indicates, however, in general, an exasperation of the inflammation; it does not always prove that a recovery will not take place. Those pneumonias which are not accompanied with any expectoration during their entire course, do not seem to be more dangerous than the others. Only, as their diagnosis is more difficult, they are often overlooked, and terminate fatally, because they are not properly treated. Thence the greater danger of latent pneumonias.

Constant dryness of the skin is much less favourable than its habitual moisture. The resolution of pneumonia often coincides with the appearance of profuse sweats.

We shall not insist on the greater danger of pneumonia, when it is complicated with the other diseases, whether it precedes them, or declares itself during the course of the latter. The pneumonia which attacks phthisical patients seems less injurious by its own immediate danger, than by the baneful influence it exercises over the tubercles, whose increase and softening it favours.

95. Pneumonia is one of those diseases whose treatment is at once most simple and most efficacious. For many ages back, observation led physicians to employ copious bloodletting in this affection more than in any other. It is easily conceived, in fact, how useful copious bleedings may be in this case; they not only act as in all other inflammations, they have the additional advantage of directly diminishing the quantity of blood, which, in a given time, must traverse the lung in order to be subjected to the action of the air; they diminish then the activity of its functions, and thus concur in curing the pneumonia, in the same manner as an ophthalmia is cured by preventing the exercise of vision, and rheumatism by prescribing rest.

The application of leeches cannot here be substituted for opening a vein; but we may employ both kinds of bleeding simultaneously with great advantage.

In former times there was great disputing as to which was the most suitable part to bleed from. The place of election is of little importance; but what is essential is, that the blood should flow in great quantity at once by a large orifice. Fainting, however, should be avoided. Quarin regards syncope produced by bleeding as more dangerous in peripneumonia than in any other case. We have not verified this fact.

The first bleeding should, in general, amount to sixteen ounces, and even twenty, when the disease is at its onset, when the dyspnœa is severe, and the patient strong. According as the blood flows, there is ordinarily observed a perceptible amendment of the symptoms; the breathing particularly becomes more free. When the pneumonia is slight, this amendment continues, and the signs of commencing resolution soon manifest themselves. It is in cases of this kind that it may be truly said that the bleeding has really removed the disease; but however slight the pneumonia may be, the amendment which follows the first bleeding lasts but a few hours, then the dyspnœa reappears, and the inflammation recommences as if no bleeding had taken place. We must not hesitate then to open the vein again; thus, two or three bleedings may be employed during the first twenty-four hours. On the following days, the bleeding must be repeated boldly, should the symptoms not yield. The indication for bleeding should be derived much less from the state of the pulse than from that of the respiration. How many times have we not seen bloodletting employed with the greatest advantage in persons whose pulse was small and

contracted, face pale, extremities almost cold, general debility apparently very great, but in whom at the same time the breathing was very much embarrassed. In other patients, on the contrary, whose pulse is full and hard, but whose breathing is sufficiently free, bleeding is much less imperatively called for. If we wished to call in the authority of great masters in support of those precepts, we should state that Stoll, solely guided by the extreme difficulty of breathing, bled eight times with success, in a short space of time, a patient who appeared very much debilitated, and all whose body was covered with petechiæ. The consideration of age should seldom prevent us from employing numerous bleedings. Aged persons affected with pneumonia have been often left to die, because the physician did not dare to bleed them. Frank mentioned that he bled a man eighty years old, whose life was in danger in consequence of severe pneumonia, eight times with success. Recent experience has satisfied us that bleeding should no more be spared in children than in adults. However, as in them but little blood is obtained from the orifice, in consequence of the smallness of their veins, we should particularly insist on numerous and frequent application of leeches. Many practitioners are afraid to bleed women affected with pneumonia, when they are menstruating. This is, in our opinion, a frightful mistake. To wait, in this case, till the menstrual flux has passed, in order to combat by bleeding an intense inflammation of the lung, is to render it almost necessarily fatal. Our view of this matter is strengthened by that of De Haen and of Frank.

Up to what period of the disease should bleeding be employed? Sixteen centuries ago, Galen laid it down as a general principle, that we should have recourse to bleeding, whatever was the day of the disease, aye, even if it were the twentieth, every time it was indicated. However, physicians, forgetting this precept, have been for a long time of opinion that it was dangerous to bleed in pneumonia after the fifth or, at farthest, the sixth day. This precept was given by one of the greatest modern observers, by Pringle, who expressly recommends not to open a vein, after the characteristic sputa of pneumonia have commenced to appear. It is unnecessary to say how erroneous such an opinion is; we must bleed, whatever be the period of the disease, every time the nature of the symptoms calls for bleeding. Even the existence of the third stage does not always contraindicate it; for this third stage often coexists with the two first, and the latter may still be combated with advantage by the bleeding. Frank is one of the physicians who have insisted most on the great advantages which bleeding may still present, at a very advanced period, and even when the patients seem moribund. We think it right to transcribe here the remarkable passage where he expresses his opinion on this subject: *In ultimo peripneumoniæ lethalis gradu, certe nec venæ sectio juvat, nec quodvis aliud remedium juvat; ac cum hujus aut illius vituperio inermem tam infaustis rebus artem opponimus; interim audaces, sæpe, non fortuna quidem, sed consilium juvat; nec rarò, quod vix dictum est, sub frigidis jamjam extremitatibus, facie vix non cadavericâ, pulsibusque minimis, vænam suffocanti ægro cum felici rerum exitu aperuimus, et vitæ sors unica ex cuspide hæsit lanceolæ.*

When, during convalescence, we observe some symptom which may cause us to apprehend a relapse, we should take some blood instantly; in such a case temporising would be fatal. We cannot repeat it too often: the residue of the latent inflammation, with which the lung often continues affected at the time of convalescence, and which auscultation alone, in many cases, can detect, cannot be combated with too much care. If we neglect bloodletting, if we content ourselves with the employment of hygienic means, we allow the inflammation to become in a manner domiciliated, and we favour, in many persons, the development of phthisis pulmonalis.

However, bloodletting is not the only means by which pneumonia should be

combated. When there is no longer any reaction, and that different local irritants can act only as revulsives, we must have recourse to them. The most favourable time for the employment of revulsives is principally indicated by the weakness of pulse, which continues, after repeated bleedings, apparently for the want of general reaction. It must be acknowledged, however, that nothing is more delicate than this point of practical medicine. It often happens that, of two persons placed apparently in the same circumstances, the one is visibly relieved by the application of a blister, whilst, in the other, the symptoms become worse. In the latter case we must not hesitate again to have recourse to bloodletting.

In what part should blisters be applied? Cullen, Stoll, and Pringle, placed them on the chest; Baglivi recommended that they should be applied to the lower extremities; M. Lerminier applies them first to the legs; he lets them heal, and then applies two more to the thighs; he only applies a blister to the chest when the disease seems to become altogether chronic.

The application of a blister to the arm, and even of a cautery, is often very useful at the period of convalescence, as often as there is any fear that the resolution of the pneumonia is not complete, and after recourse has been had to bleeding.

When there is still considerable reaction, and that we think it right however to have recourse to revulsives instead of blisters, we can apply sinapisms to the lower extremities, having rendered them less stimulating by the addition of some linseed meal. The sinapism is indicated, says Quarin, when the pulse is still full, the face red, and the heat considerable. In this case, he says, cantharides would increase the fever, produce delirium, and aggravate all the symptoms.

As long as bleeding is being employed, nothing but emollient drinks should be given internally. Frank has recommended for this purpose a ptisan consisting of two pints of decoction of barley, a drachm of nitre, and an ounce of simple oxymel. It is generally said that these drinks should be given warm; others, however, have not only given them cold, but have even combined them with snow.

It cannot be disputed but that at certain periods of the disease, at the same time that bleeding is replaced by revulsives, medicines more or less tonic and stimulating have been often substituted with advantage for simple emollient drinks. Many of our patients have taken, with striking advantage at this period, the decoction of polygala seneka, and kermes given in the dose of two or four grains in a four ounce potion. It is not when there is suppuration of the lung that these means can be really useful; they can then only excite a little reaction, the result of which is an apparent and momentary amendment. But the employment of these medicines seems to us really advantageous in the common cases where the pneumonia, still in the first stage, remains stationary, though there be no longer any evident signs of reaction, either local or general. It seems, in cases of this kind, that the inflammation is below the degree which is necessary to it, in order that it may be able to proceed to a resolution. The slight stimulation which tonics then introduce into the system favours this resolution, as that of several other inflammations, such as chronic ophthalmia, or chronic uretritis, &c. The same treatment is still more manifestly useful in the case where all the inflammatory state having disappeared, there merely remains in the lung a sanguineous or serous engorgement evidently of a passive nature. We have given several cases of this kind.*

Frequently also, in such cases, the employment of purgatives is followed by

* We cannot insist too much on these remarkable cases, where an organ remains the seat of an entirely passive hyperemia after the irritation had ceased, which excited active hyperemia in this organ. (See *Pathological Anatomy.*)

very happy effects. We have, more than once, seen persons in whom there no longer remained any other sign of pneumonia than a crepitous rale, which was heard in a more or less extensive part of both lungs, or of one only. There was at the same time slight dyspnœa; some cough; the pulse was in general free from frequency when the patient was at rest, or else it was accelerated only at intervals. These different symptoms yielded after one, two, or three purgations.

Let us now speak of the symptoms which may require some modification in this treatment.

Every time the pain of the side is severe, it should be combated by the application of leeches to the affected part. Leeches are here more effectual than general bleeding. Their effects will be seconded by the long-continued application of emollient cataplasms and fomentations. In children, whose thoracic parietes are very thin, these applications not only remove the pleuritic pain, they seem even to moderate the inflammation of the lung.

We have already particularly dwelt on the causes of suppression of the sputa. According to the nature of these causes, we should endeavour to re-establish them sometimes by bleeding and antiphlogistics, sometimes by the different stimulant remedies known by the name of expectorants, such as kermes, oxymel of squill, &c. This class of remedies have been strongly abused; they seem particularly useful when the patients no longer have strength to expectorate the tenacious and viscid matter which obstructs the bronchi. From this arises a new cause of dyspnœa, which alone may occasion death. In cases of this kind, the expectoration has been facilitated very much by making the patients inhale the vapour of diluted vinegar.

We have also already spoken of the cases in which the employment of an emetic may be necessary. We have seen that pneumonias called bilious have been too much multiplied, but still that a vomit may be given with advantage, when there are evident symptoms of gastric disturbance. It is but exceptionally that, in cases of acute pneumonia, the revulsive action of vomits may be considered useful.

There are persons who, by reason of a peculiar disposition, cannot be attacked with any inflammation whatever without nervous symptoms, more or less serious, manifesting themselves. There are others who, in consequence of the slightest inflammation, suddenly fall into a state of real prostration. In the former case, numerous applications of leeches should be made either to the neck or behind the ears; revulsives should be employed with precaution. In the latter case the treatment becomes very delicate: bleeding should be less profusely employed, and emollients continued for a shorter period. We should rather have recourse to revulsives; they should be applied to every part of the surface of the body, and if there be no complication of gastritis, tonics should be given. But it often happens that the adynamic state is but apparent; it results from the coexistence of a gastro-intestinal inflammation, and consequently calls for quite a different treatment. Real medical skill consists in being able to distinguish these different states, and in not wishing to reduce them all to one. In these latter times, the contra-stimulant treatment has been applied to pneumonia, and the preparations of antimony, in large doses, have been principally employed in the treatment of this affection. I have repeated these trials, and here are the results at which I arrived.

I administered tartar emetic, from the dose of six grains to that of thirty-two in the twenty-four hours, and continued its employment for several successive days. I gave it either dissolved in four glasses (*verres*) of infusion of orange leaves, or concentrated in a five-ounce mixture. In none of these cases, except two, did I see any serious accident arise from this treatment; sometimes the patients manifested no sign of gastric or intestinal irritation; they had neither

nausea, nor vomiting, nor diarrhœa, nor abdominal pain; the tongue remained moist and free from redness; sometimes the patients had nausea, which in some became so distressing, that it was impossible for them to continue the use of the medicine; others, in fine, had vomiting and diarrhœa. But in all the cases which fell under my observation, nothing more was necessary to dispel the unpleasant symptoms but the discontinuance of the tartar emetic.

From these facts it follows, that tartar emetic may be given in a large dose for several successive days, without its use being attended, in the great majority of cases, with any unpleasant effects regarding the digestive passages. But is this medicine useful? My answer is, that without meaning to deny what has been stated by others, in none of the cases observed by myself have I seen the pneumonia beneficially influenced by the use of tartar emetic in a large dose. This medicine has not appeared to me more effectual against pneumonia in the cases where it was *tolerated*, than in those where it occasioned painful nausea, vomiting, or diarrhœa.

I also tried the white oxide of antimony in the treatment of pneumonia; I gave it either generally, or in a five-ounce mixture, from the dose of a drachm (*gros*) to that of eight drachms in twenty-four hours. In no case have I seen this medicine, provided it was well washed, produce any appreciable disturbance in the digestive passages. I never saw, as some have stated, that the white oxide of antimony lowers the respiration and circulation. With respect to its therapeutic influence, it appears to me to be not at all marked, and I doubt very much, from what I have seen myself, that this agent was ever of any advantage in the diseases in which it has been employed.*

* Rasori, an Italian physician, was the first who introduced tartar emetic in the treatment of pneumonia, and that not for its emetic effects, but for its *contra-stimulant*, or anti-inflammatory properties. His mode of giving it was as follows:—After one or more bleedings, and occasionally without any bleeding, he gave from twelve to twenty-four grains, or in severe cases, from a scruple to half a drachm, during the day, and the same he repeated at night: these doses were daily increased, until they amounted to a drachm or several drachms in the twenty-four hours. The result of this practice was, on the whole, successful; the number of deaths being about 22 per cent. in the civil hospital, and 14 per cent. in the military.—Laennec's mode of giving it was thus:—Immediately after bleeding, he gave one grain of the tartar emetic, dissolved in two ounces and a half of cold weak infusion of orange leaf, sweetened with half an ounce of syrup of marsh-mallows, or orange flowers; this he repeated every hour for six times, after which, unless the symptoms were urgent, he suspended the use of the medicine for seven or eight hours. But when the case was urgent, he continued the medicine uninterruptedly until some amendment took place, sometimes increasing the dose of the tartar emetic to a grain and half, two grains, or even two grains and half, without at the same time increasing the quantity of the vehicle. For further particulars regarding the employment of tartar emetic in pneumonia, see Dr. Forbes' admirable translation of Laennec's work, 4th edit. p. 232, et seq.; also, a very instructive and interesting note by Dr. Forbes (p. 244), concerning the history of this medicine, in which note the reader will find the testimonies of different practitioners regarding its efficacy. It may be well to mention that Dr. Forbes himself, *non sordidus auctor*, in giving the result of his own experience, says that, "in pure pneumonia, the tartar emetic, in large doses, is the most certain and powerful remedy we possess, excepting, perhaps, bloodletting; and that in many cases it is capable of producing the most striking and beneficial effects, when bloodletting is no longer applicable." Drs. Graves and Stokes, of Dublin, also speak favourably of this medicine; they, however, make it secondary to bloodletting. They commence with a mixture, containing six grains, for the first twenty-four hours, and add to this two or three grains each day afterwards, as the severity of the case may require, till fifteen grains are given daily; beyond this quantity they do not go. They employ general and local bleeding freely. The treatment by this medicine they consider most eligible in strong constitutions in the early stage of inflammation, before hepatisation has taken place. Dr. Williams coincides in the above views.—See Cyclopædia of Practical Medicine, vol. 3, article *Pneumonia*.—Trans. Also, *Stokes and Bell's Lectures*, 2d edit., in which the use of tartar emetic is recommended, as a contrastimulant, in Laryngitis, Croup, Acute Bronchitis, and Pneumonia.

SECTION III.

OBSERVATIONS ON PULMONARY PHTHISIS.

CHAPTER I.

NATURE AND SEAT OF PULMONARY TUBERCLES.

1. In lungs, several of whose lobules are in different degrees of inflammation, so as to contrast by their colour and consistence with the surrounding lobules, we sometimes find within these diseased lobules very small whitish points, of which some, consisting of a liquid matter, resemble a small drop of pus, and are, like the latter, easily removed by gently passing the back of a scalpel over them. Others of these points have a greater consistence; the matter constituting them seems to pass by little and little from the liquid to the solid state; having at length arrived at this state, it presents the appearance of what is called *tuberculous* matter; in other words, it constitutes a small rounded mass, of a yellowish white, and of great friability, as if the molecules composing it, being originally separated by a more liquid matter, had still but little cohesion between them. The lobules in the midst of which these white points appear, present not only the different ordinary degrees of pneumonia; sometimes we have seen these lobules really infiltrated with a yellowish serum, and, like œdematous parts, they retained the impression of the finger. This peculiar alteration, this real œdema of the pulmonary lobules, with formation of tuberculous points, seemed to exist to us more frequently around tubercles in the horse than in man. Neither can it be said that this state of the lobules is always consecutive on the development of tuberculous matter, for in several lobules thus infiltrated, no trace of the latter can be found. In some parts we observe on the surface of the lobules or in their substance only some white, very small points, almost microscopic; in other places they are multiplied and united, and lastly, it sometimes happens that entire lobules seem formed merely of these points crowded together. Then the result is a large whitish mass, called *tubercle*, which is nothing but a lobule successively attacked and occupied by white points. This disposition might be appreciated with peculiar ease in a case which we lately met, and where each affected lobule was exactly circumscribed by the interlobular cellular tissue, which was thicker and more apparent than ordinary, but exempt from all appearance of tubercles. At other times, on the contrary, the spaces usually occupied by this same cellular tissue, are partly filled with a whitish matter, which does not lay hold on the lobules, and which, by reason of the nature of the tissue occupied by it, constitutes a track of concrete pus around lobules which have remained sound. It may also be laid down as a general principle, that when the latter are diseased, the cellular tissue surrounding and isolating them is equally affected: this cellular tissue is then for each lobule what the pleura is for the entire lung. The most frequent of these alterations of the interlobular cellular tissue consists in a reddish infiltration, such as exists in certain commencing phlegmons; in the midst of this infiltration we have observed tubercles in the form of very small isolated white points. At other times, in fine, it is an entire pulmonary lobe which is uniformly inflamed: then we can no longer distinguish either the limits of any lobule in particular, or the interlobular cellular tissue. But often in the midst of this great extent of hepatised parenchyma, we observe a greater or less number of small

white points, similar to those which we have described in these lobules, with their different degrees of consistence. In a case recently observed we satisfied ourselves that the matter which constituted these white points was inclosed in very fine bronchial ramifications, in that part where they may be conceived to be on the point of forming vesicles. What was remarkable in this same case was, that the lower lobe of the two lungs was inflamed, but in different degrees. On the right the inflammation was more recent, and the pulmonary parenchyma was only in the state of red hepatisation: there was no appearance of these white points, nor any trace of tubercle. On the left the inflammation was of a longer standing: the parenchyma of the lower lobe was in a state of grey induration: it presented a great number of these white points, some liquid, like a small drop of pus, others of a greater consistence, and rising by degrees, in a manner, to the state of tubercle.

In the different cases now mentioned, what do we obtain as the primary origin of tubercle? Nothing else but a secretion of matter which seems to be produced indifferently, either in the last bronchi and in the vesicles which succeed them, or in the cellular tissue interposed between the latter, or in the interlobular cellular tissue. This matter, which seems to be primarily liquid, becomes solidified at a period more or less remote from that at which it was secreted, and becomes a tubercle. Is every tubercle formed thus? Before drawing this consequence and transforming it into a sort of law, let us see whether we shall find other cases, where the tubercle seems to have another mode of primary formation.

2. In several individuals who had laboured under a chronic bronchitis more or less intense, we found, scattered through the pulmonary parenchyma, small rounded or elongated bodies, reddish or greyish, sometimes remarkable for their softness, sometimes, on the contrary, rather hard, and sometimes even of a cartilaginous appearance. These bodies appear equally in the midst of a healthy or diseased pulmonary parenchyma. Their number is very variable; sometimes there are only five or six found scattered through the entire extent of a lung; sometimes an immense quantity may be observed. It is these bodies which, when they are greyish and of, as it were, cartilaginous hardness, constitute the pulmonary granulations so well described by Bayle with respect to their external form. In these latter times Laennec has expressed his opinion that the granulations of Bayle were nothing else than a first degree of tubercle; he rested principally on this circumstance, that in the centre of these granulations a white point is often seen to appear, which announces the moment when, according to Laennec, the granulation becomes transformed into a miliary tubercle. First it might be objected to this opinion, that the granulations of Bayle are very frequently developed in the lower lobes of the lung, and that consequently if they were destined to become tubercles, we see no reason why caverns should not exist towards the base of the lung as often as at its summit. It is true that in the small bodies of which we speak, white points are often observed; but we have ascertained that the latter do not always appear in the centre, as Laennec says; they are observed indiscriminately through all parts of the granulation; often, for instance, they attack its circumference before they occupy its centre. Besides, if the granulations described by Bayle were nothing else but nascent tubercles, they should be met, sometimes at least, existing in other organs previous to miliary tubercles; now this has never been observed, either within the parenchyma or on the surface of the membranes. The smallest rudiment of tuberculous matter met with in these different parts, always presented itself under the form of white points very different from pulmonary granulations. In the intestines, indeed, besides these white points, we often enough find small round bodies which are greyish, like the pulmonary granulations of Bayle; but these bodies are follicles more or less

developed, as we shall prove elsewhere. With respect to the granulations observed on the surface of serous membranes, M.Chomel has already very clearly remarked that between them and pulmonary granulations there is but a common name (Dict. de Méd., 18 vol. article *Granulations*). The grey and hard granulations of Bayle seem to us to be only one of the forms of the bodies of which we now speak; thus we often find them red and of greater or less softness; if they are separated from the parenchyma which surrounds them, we see that several unite in clusters, or else in beads. We may be assured, by attentive examination, that such of these bodies as are white or greyish, and as it were of cartilaginous hardness, were at first reddish and soft. In one or other of these states, we likewise see, though not always, white points scattered through their interior; often also they are partly coloured black. If there be any organ in the system with which we cannot compare these bodies in their different states, when they have been separated by a careful dissection from the tissue surrounding them, it is unquestionably with lymphatic ganglions, either in the healthy state, or particularly in a state of inflammation.*

The analogy is peculiarly striking in the horse, where the large size of the objects allows a better examination of them. These bodies, red and soft, exactly resemble small lymphatic glands affected with acute inflammation; when greyish and harder (granulations of Bayle), they may be compared to these same glands in the state of chronic inflammation. In the latter we may often see the tuberculous matter deposited in the form of small isolated points, which gradually multiply and evince a tendency to combine, so that there comes a moment when the lymphatic ganglion no longer really resembles any thing but a large tubercle; and it is in precisely the same way that the white points appear and become developed in the pulmonary granulations. Let it not be objected here that in the normal state anatomy does not show the existence of these ganglions in the lung; for there are lymphatic vessels in the lung; and where these vessels exist, observation informs us that under the influence of inflammation lymphatic glands may become developed which did not exist, or at least were not visible before. Certainly the appearance of these granulations, and still further the analogy of the mesenteric ganglions which become engorged and tuberculous consecutively on a chronic enteritis, seemed naturally to incline one to admit that the pulmonary granulations are nothing else but lymphatic glands. This opinion is also very ancient. Morton long since expressed the idea that tubercles were owing to engorgement of the glands of the lung. This same opinion is contained in Mr. Portal's treatise on pulmonary phthisis. And in later times M. Broussais has lent it the support of his great talents; so that at present we have in France just three opinions respecting the nature of pulmonary granulations: some, with Bayle, consider them an accidental production, *sui generis*, which has nothing analogous in the healthy state; others, with Laennec, also consider them an accidental production, but not differing essentially from tubercles, and being the first degree of them; others, in fine, with M. Broussais, say that they are lymphatic glands engorged.

Attentive observations have led us not to admit any of these three opinions, with respect to the nature of pulmonary granulations. According to us, these granulations are not an accidental production; neither are they lymphatic ganglions, though they very often have the appearance of them. As long as we were content to examine a granulated lung by cutting it in slices, and then separating with the scalpel the granulations from the tissue surrounding them, we

* We entreat of those who would wish to verify these assertions carefully to separate the granulations from the tissue which surrounds them; for their appearance is then very different from that which they present, when one merely examines them on the surface of a section made in the lung.

were strongly inclined to consider them, by reason of their appearance, as lymphatic ganglions; we thought, however, that this opinion was but a mere conjecture, which should not be rejected without examination, but which should not have become a certainty unless an injection, thrown into the lymphatic vessels of the lung, had penetrated the granulations, as it elsewhere penetrates the lymphatic ganglions.

We then sought another mode of investigation: we set about to separate from one another a certain number of pulmonary lobules, without cutting them, or altering their tissue in any way. Here is what we observed in individuals affected with chronic bronchitis, and whose lungs contained at the same time either tubercles, or granulations in different degrees, from that wherein they are still reddish and soft, to that wherein they are greyish and hard, as cartilage.

Several lobules, in some points only of their extent, no longer presented any trace of the vesicles which constitute them, and in their place there was observed one of the following appearances: — 1st, an uniform, reddish colour, without increase of consistence; 2d, a greenish or greyish colour, the consistence not being increased; it was very evident that in these two cases the air which distends the vesicles in the healthy state, had been succeeded by a liquid, whether the latter filled the vesicles themselves, or existed in the intermediate cellular tissue, and the vesicles were not distended but compressed. In the first case, the liquid seemed to be blood; in the second, a serosity more or less pure. 3d. In other points there was observed the same disposition of the vesicles, the same opacity, the same colouring, and still more, a variable increase of consistence, which arose by degrees to cartilaginous hardness; the existence of the latter coincided with a whitish or greyish tint, mixed often with a black colour. The different states just described are manifestly nothing else but inflammations of a certain number of vesicles which unite in thousands to constitute a simple lobule. As long as the latter is not cut into, we still see but an uniform surface, and nothing resembling granulations; but if an incision be made in the points intermediate between the inflamed portions, and not far from the latter, a new appearance presents itself; the vesicles which remained sound were scarcely cut into when they emptied themselves of the air which distended them; in virtue of their contractility of tissue, they must necessarily return on themselves and be effaced; the inflamed portion then remains isolated, and presents itself (a thing well worthy of attention, and also quite natural) under the appearance of rounded or oblong bodies, which, according to the degree of inflammation, are variable in colour and consistence. Greyish and hard, these bodies are evidently nothing else than the pulmonary granulations of Bayle. It may be conceived, in fact, that every time an incision is made into a lung which is affected with the species of partial, and in some respects vesicular inflammation in question, we should give rise to granulations, in the same way as we have them produced on making an incision into a lobule previously isolated. Let there be two lobules presenting, when touched externally, some hardnesses unequal and similar in both: make an incision into one of these lobules, you will see granulations appear variable in size, consistence, and in form; separate the other lobule by a careful dissection from the cellular tissue which separates it from the neighbouring lobules, you will no longer have any granulations, but you will only find some points of the lobule differing from the remainder in colour, consistence, and the disappearance of the vesicles.

Thus, then, we regard the granular phthisis of Bayle as resulting merely from the existence of a great number of partial *vesicular* inflammations, in the midst of the pulmonary parenchyma. These inflammations may be so multiplied, that the granulations which they produce, when an incision is made into the lung, touch and become confounded; the pulmonary parenchyma then appears uniformly indurated. But this is merely apparent, and by a more attentive examination

we may easily satisfy ourselves, that between the granulations the pulmonary parenchyma has retained its healthy state, or at least, that it is not indurated. It is extraordinary that stress has been laid on these granulations, when they are greyish and hard, and that no author, to our knowledge, has spoken of these same bodies whilst they are still red and soft. However, the study of this first stage might have been a means of arriving at more accurate notions regarding the real nature of pulmonary granulations; there would then have been seen in these latter only a shade of the grainy appearance of pulmonary hepatisation. Besides, it is unnecessary to say, that the symptoms marked by Bayle as appertaining to granular phthisis, are also those which might be admitted *à priori* as depending on the simultaneous existence of a great number of partial inflammations of the lung; such in particular are the great dyspnœa at the frequent attacks of hemoptysis.

As we have seen the tuberculous matter appear in the midst of a lobule inflamed through its entire extent, in the same manner if one point of these lobules be separately attacked with inflammation, it is in this point particularly that the tubercle will be deposited.

3. There are some cases where the tubercle presents itself in the midst of a lobule which appears perfectly healthy. But has no process of congestion or of irritation then preceded its formation? Before answering this question, let us recollect that abscesses surrounded by a very healthy tissue have often been found in different parenchymatous structures, and yet there was no hesitation in admitting that these abscesses had succeeded an inflammatory process; they have even been given as proofs of the antecedent existence of this process. From the circumstance, then, that around a tubercle no inflammation is found, we are not warranted in concluding that the latter has not existed. We shall see at a subsequent period how far attention to the symptoms is or is not favourable to this conclusion.

4. In the different cases passed in review, the tuberculous matter always presented itself to us as a simple product of secretion. This product, appearing to be primarily in a liquid state, then becomes solid, as if by a sort of crystallisation, according as its more fluid particles become absorbed. In this product, moreover, we find neither vessels, nor canals, nor areolæ, nor fibres, nor laminæ, nothing, in a word, which suggests the idea of organisation; it appears to us, consequently, that it is giving an incorrect idea of the mode of formation of tubercle, and its nature, to designate it by the name of *accidental tissue:* it, in fact, presents to us none of the characters which, with anatomists, constitute a tissue. But if tubercle is not a tissue, why, in every part wherein it is developed, does it always assume almost an identical form, namely, the rounded form? To this objection it may be answered, that the round form must necessarily be that of every secreted liquid when it is equally pressed on all sides; thus, with some exceptions which depend on local circumstances, and especially on inequality of pressure, abscesses generally assume a rounded form.

5. The formation of tubercle by secretion being admitted, we may go further, and seek whether it is not in a particular tissue that this kind of morbid secretion takes place. We do not think so; we believe, on the contrary, that every tissue capable of inflammation and suppuration may also secrete tuberculous matter. In the lung, in particular, observation shows that this matter may equally be produced, 1st, on the surface of the mucous membrane of the air passages, or in the bronchi, or in the pulmonary vesicles themselves; 2d, in the cellular tissue which unites the different parts of the lung.

M. Magendie,* and after him M. Cruveilhier,† have stated it as their opinion,

* Journal de Physiologie experimentale, tom. 1.

† Medécine pratique, etc., fascicule premier

that tuberculous matter may form in the ultimate extremities of the bronchi. The following fact seems singularly adapted to confirm this opinion : —

During the month of May, 1825, we opened the body of a glandered horse, with M. Dupuy. The membrane of the nasal fossæ presented cases of chronic inflammation, with formation of tubercles. Some were also found in the lung. But what was more, towards the upper part of one of the lungs, there existed a large cavity, from whence a liquid purulent matter flowed in great quantities, in the midst of which there was suspended numerous white clots, and so closely resembling the matter which most commonly fills tuberculous excavations of the lung, either in man or in the horse, that every person present at the autopsy, at first thought, as well as ourselves, that an immense cavern existed at this part of the lung. But we were soon undeceived, when, after having given exit to all the matter contained in the cavity, we discovered that the parietes of the latter presented all the characters of the bronchial parietes when in a state of chronic inflammation. It was, in fact, but a bronchus considerably dilated; numerous ulcerations traversed its mucous membrane, and from the bottom of these ulcerations there were observed to rise, like ridges, numerous fragments of corroded roughened cartilages. Several of the smaller bronchi which succeeded that just now mentioned, were altered in the same way, and filled with solid clots of a white matter, friable, and crumbling under the finger like cheese, and which may be truly considered as the type of tuberculous matter. These bronchi did not communicate with any excavation. Thus, in this case, it is very evident that the tubercle had been the product of a secretion, and that this secretion took place on the surface of the bronchial mucous membrane, which was ulcerated and disorganised. But why could not the same phenomenon which takes place in the air-tubes of considerable diameter, also occur in the smaller tubes, in the capillary branches, and even in the vesicles, which seem to be but their continuation, or expansion ?* In some cases, in fact, we have satisfied ourselves, as well in the horse as in man, that a matter which altogether resembled small miliary tubercles at the moment the lung was cut into, was contained in extremely fine bronchi ; but this seat cannot be ascertained, except when the tuberculous matter is only in its nascent state, that is to say, liquid or half liquid ; it is then only that the ease with which it is forced out, by simple pressure, from the cavity where it was contained, allows us to ascertain that this cavity belongs to a bronchus, a circumstance which it is no longer possible to ascertain at a later period, by reason of the greater difficulty in extracting the tuberculous mass entire, and without any laceration.

Such is, in our opinion, one of the organic elements of the lung in which tuberculous matter may form ; but it may also be produced elsewhere : thus we have already cited facts which prove that tubercle may also be secreted in the interlobular cellular tissue ; if this fact be conceded, its consequence also must be admitted, by acknowledging that the production of tubercle may also take place in the cellular tissue, which in the interior of each lobule separates and again reunites the vessels, nerves, and bronchial ramifications ; for it is a well-established law, that the diseases of a tissue must be the same in the different parts of this tissue, except some cases where its structure is accidentally modified. Are instances required of tubercles formed and truly secreted as pus in different parts of this same cellular tissue ? We have seen tuberculous matter irregularly deposited between the muscular fasciculi of one of the arms of an individual in whom this limb was the seat of old and extensive abscesses. We may here refer in particular to an important fact, and one which has, no doubt, been seen by all those who have opened the bodies of a certain number of chil-

* Consult on the nature and disposition of these vesicles the splendid plates and text of Reissessen's work, De Fabricâ Pulmonum.

dren. It is known that in them encephalic tumours are as common as they are rare in the adult; now, in several these tubercles were not seated in the cerebral substance itself: often, for instance, we have seen the laminæ of the cerebellum separated and pressed back, but not occupied by depositions of tuberculous matter seated in the very vascular cellular tissue forming one of the membranes called pia mater. And here again we might convince ourselves of the correctness of the opinion which considers tubercles as the product of a secretion, as pus of a peculiar nature. In fact, we have more than once been able to see the matter called tuberculous to be at first but liquid purulent matter infiltrating the pia mater: it then became solid, gradually changed its appearance, and became tubercle. In an adult, in whom the serous membranes of the thorax and abdomen were covered with false membranes, with a deposition of small tuberculous masses, the latter were also found in the subarachnoid pia mater of the convexity of the hemispheres, but the tuberculous matter was still in its nascent state. In several points, in fact, there were found but mere drops of liquid matter, of real pus; in other parts the latter assumed greater consistence, and thus it was observed gradually to put on an appearance similar to that of the tubercles which filled the false membranes of the pericardium, pleura, and peritoneum. Observe that in this case, where there were also tubercles in the lungs, there was a remarkable tendency in inflammation to terminate in the formation of these bodies; in other individuals differently predisposed, the matter secreted by the inflamed serous membranes remained the pus of a phlegmon; in others it was but serosity; in others, in a word, it was transformed into a solid matter, which became a fibrous mass, a cartilaginous concretion, a petrifaction, etc.

7. Lastly, it is not even improbable that in some cases the tuberculous matter is primarily formed in the lymphatic ganglions of the interior of the lung previously tumefied. If M. Broussais, guided by the analogy of what takes place in the mesenteric ganglions consecutively on an enteritis, was satisfied with saying that *sometimes* also the lymphatic glands of the lung are inflamed, become manifest by the tumefaction which they undergo, and at last become tuberculated after a bronchitis, he would have stated an opinion which is very probable; but when M. Broussais wished to generalise this idea, when he stated that pulmonary tubercles were constantly seated in the lymphatic system of the respiratory apparatus, he expressed an idea which seems to us to be in complete contradiction to that which observation teaches us, with respect to the manner in which tubercles are developed, whether in the lung, or particularly in other organs. We again repeat it, engorgement of the lymphatic ganglions of the lung may be the original commencement of a certain number of pulmonary tubercles; but a fact barely possible is very different indeed from a fact proved. With respect to the lymphatic vessels themselves, we have seen them, in two cases only, filled with a matter which had the appearance of tubercle. Whatever be the consequence which may be drawn from these two facts, the rarity of their occurrence obliges us to detail them here.

Case 1.—Lymphatic vessels of the periphery of the lung filled with tuberculous-like matter.

A mason, twenty-five years of age, died of chronic pericarditis. He had had no other symptom with respect to his lungs except a cough, which lasted for the last four months before his death. At the base of one of his lungs there existed a circumscribed sanguineous infiltration (pulmonary apoplexy), which occupied a space nearly equal to that which might be filled by a small apple. Quite near this sanguineous infiltration, there was found a tuberculous mass of the size of a nut. In different points of its extent there were observed small red spots, owing probably to the tissue infiltrated with blood, in the midst of

which the tuberculous matter seemed to have been developed. From the environs of the place where the latter existed, a lymphatic vessel proceeded, which passed between the pulmonary tissue and the pleura, and ceased to be visible not far from the bronchial ganglions. This vessel was tortuous, and in its course presented granulations, like that of a string of beads, of a greyish white; one would have said they were small lymphatic glands placed at intervals, as swellings in the course of the vessel. The latter having been cut into, it was ascertained that these granulations were owing to the presence of a concrete white matter, collected in clots in the interior of the lymphatic; from space to space the parietes of this vessel likewise presented an unusual thickening, and at the same time a diminution of transparence. At first view, and previous to the dissection, the swellings just described presented the greatest resemblance to small miliary tubercles. The latter existed also in great numbers in the interior of the same lung. The lung of the opposite side presented no other lesion than several traces of pulmonary apoplexy without any tubercles.

Case 2.—Matter of a tuberculous appearance in the lymphatic vessels of the lung and of other parts, as also in the thoracic duct.

A woman affected with cancer of the uterus, died in the La Charité. The external surface of both lungs was traversed by a great number of white striæ, closely resembling in their disposition lymphatic vessels full of mercury. These numerous striæ were in fact vessels filled with a whitish concrete matter, of slight consistence, readily crumbling under the finger. Several of these vessels were easily followed as far as the bronchial ganglions, which were swollen, and had degenerated into a substance of a greyish white colour, creaking under the scalpel. The interior of the two lungs, and particularly the left, also contained several of these vessels, similar to white threads, enlarged at intervals. Sometimes they were found isolated; sometimes collected together in a greater or less quantity, they represented species of plexus, similar to those which, in certain animals, occupy the place of lymphatic ganglions. In other respects, and this must not be forgotten, there was nothing found in any part of the lungs resembling tubercles. But the absorbents of the lung were not the only diseased part of the lymphatic system: from several of the inguinal ganglions, which had degenerated like the bronchial ganglions, lymphatic vessels proceeded, distended by limpid and colourless serosity, and presenting from space to space white points easily displaced by slight pressure. The matter which formed these white points seemed then to be contained only in the cavity of the vessels. In fact, a slight incision having been made in the parietes of the vessels, this matter escaped from them spontaneously by the mere fact of the elasticity of the vessels which contained it. It presented the same characters as those of the matter enclosed in the vessels of the lung. Some lymphatic canals, thus distended from space to space by whitish clots, rounded into small masses, or elongated into a cylindrical form, were easily traced under the crural arch, into the pelvis, to the middle of an enormous cancerous mass which existed anteriorly to the body of the lumbar vertebræ. The thoracic duct disengaged itself from the middle of this mass, just at the last dorsal vertebræ. In three or four places this canal was very much distended, and, as it were, obstructed by the same matter which filled the lymphatics. It formed masses there, the largest of which equalled the size of a nut, and which, as in the vessels, was contained in the cavity of the duct, without having any connexion whatever with its tissue.

Was the foreign matter of tuberculous appearance, found in these two individuals in a part of the lymphatic system, introduced into it by absorption, or else was it formed or secreted there? Shall there be found in these facts a proof in favour of the opinion which places the seat of tuberculous affections in

the lymphatic system? These diseases were formerly attributed to the alteration of the lymph. No doubt it was very wrong always to consider this alteration abstractedly from the state of the solids: but what was well known is this, that there is such a disposition of the system, in which every liquid, accidentally secreted, has a singular tendency to assume that particular appearance which constitutes scrofulous pus, or the matter called tuberculous. Thence particular therapeutic indications.

8. If, as we have endeavoured to prove, pulmonary tubercles are merely the result of a morbid secretion, it follows that, in every place where a tubercle is formed, a process must have taken place more or less analogous to that which takes place in any secreting organ whatever: now all that we can discover in the natural secretions, is a more considerable afflux of blood and of vitality; in other words, a congestion in the secreting organ; this fact is indisputable. Nutrition, properly so called, which is but another mode of secretion, can occur only under the influence of this same active congestion. Thus, to give a very obvious instance of it, the cartilage which is about to be transformed into bone, previously receives the red part of the blood; it is injected, and becomes the seat of an active congestion. The same phenomenon takes place, whether a temporary cartilage is ossified in the embryo, in virtue of the regular laws of formation, or a permanent cartilage is ossified in an accidental way, and under the influence of what is called an inflammatory process. What do I say? the entire fœtus itself, from the first moment of a fecundating coitus, to the term of intra-uterine life, is formed and developed only under the influence of these same appreciable causes, which, in the physiological state, give to a gland the power of creating a new liquid, and which, in the morbid state, give organisation to a false membrane. What is there in common in all these phenomena, except a sanguineous congestion, with a tendency to a new formation? This is all we perceive: what escapes us, is the special disposition in virtue of which, from the afflux of blood towards an organ, there result formations the most varied, first, according to the different organs; secondly, in the same organ, according to a number of circumstances more or less appreciable. If then tubercle be a secretion, if it be a new formation in the midst of an organ, all the known phenomena must incline us to conclude that its appearance has been preceded by an active congestion of the liquids in the organ where it exists. Is this congestion always an inflammation in the sense according to which this term has been this long time employed by surgeons? Certainly not; no more than there is inflammation in this sense in the gland, before it secretes the liquid which it is commissioned to form, or separate from the blood. Only here it a normal function; there it is a pathological function, connected with a new disposition in the organ which is the seat of it. From the first period of the formation of the fœtus, the cellular tissue was disposed to secrete serosity: in virtue of a disposition accidentally acquired it will secrete natural blood, at other times pus and its numerous varieties, at other times tubercle, sometimes gases, &c. If the disposition to the formation of such new product is very marked, then the slightest congestion will suffice to give rise to it; wherever this congestion shall be repeated, the same product will show itself, and thus, for instance, what is called the *tuberculous diathesis* will commence. If, on the contrary, this disposition is less strong, in order that tubercle may form, it will be necessary that the congestion be sufficiently intense and sufficiently permanent to raise itself to the degree of inflammation. If, in fine, this disposition does not at all exist, the most severe, or most lasting inflammation will not produce tubercle. The frequent development of cerebral tubercles in children may be given in support of what has been just said. In them it is very true that tubercles are very frequently not preceded in their formation by any sign of well-marked inflammation of the brain or its membranes; but observe how irritable the nervous centres are in children; with what facility all diseases in them react sympatheti-

cally on the brain. Remember, on the one hand, that children carry in their constitution a great predisposition to tubercles: this is proved by all their inflammations, which terminate more frequently than in the adult in the formation of a great number of tubercles. These facts being laid down, you will conceive the frequent formation of tubercles in the brain of children, and you will place the causes of them in the excess of vitality, in the activity of those congestions which the nervous centres present in this first period of life.

From the facts collected in this article, and the discussions to which they have given rise, we think we may draw the following conclusions: —

1. Pulmonary tubercles are the product of a morbid secretion.*

2. It does not appear correct to designate them by the name of *tissue*, since they have none of its anatomical characters.

3. The pathological process which precedes the tuberculous secretion is an active sanguineous congestion, similar to that which precedes every process of secretion, normal or otherwise.†

4. This secretion may take place in several of the tissues which enter into the composition of the lung.‡

* The interesting researches of M. Dupuy, professor at Alfort, on the formation of tubercles in the lungs of several ruminant animals, and particularly of cows, may serve further to confirm this assertion. The result of these researches is, that on the external surface of the hydatids which are developed in the lungs of these animals, between the proper membranes of the entozoaire and the fibrous cyst enveloping it, there is often seen a whitish semi-liquid matter deposited, which on becoming dry resembles tubercle. In some cases the hydatid is destroyed, and the cavity which it occupied becomes filled with a tuberculous matter, which is secreted, says M. Dupuy, by the inner surface of the cyst. We also found in the liver of a rabbit a mixture of tuberculous matter and hydatids, such as was observed in the ruminantia by the learned Alfort professor. The liver of this animal was studded with a great number of hydatids, which presented themselves under three different aspects. Some were entire and in contact with the tissue of the liver, from which they were separated merely by a thin membrane of a cellulo-fibrous nature. The others, which were also entire, were separated from this membrane by an irregular mass of whitish friable matter; one would have said they were small portions of curds, or chalk saturated with water. Others of these hydatids were burst, and nothing was found but the remains of their gelatinous tissue in the midst of the substance just described, which occupied their place.

There is no analogy between these facts and those contained in Dr. Baron's work. The latter gentleman thinks that every tubercle is preceded in its existence by a serous vesicle which he calls a hydatid. Observation of men and animals does not support this assertion: it merely proves that there is a coincidence in some cases between the formation of hydatids and that of tuberculous matter. As in the cases above mentioned, we have seen this matter surround hydatids and contribute perhaps to their destruction, in like manner in man have we seen blood, pus, and a variety of liquids effused around hydatids, and the latter sometimes exists only under the form of debris in the midst of a collection of blood or pus. In all these cases nothing is seen but a morbid secretion with products more or less different.

† Whilst I say that a hyperemia infinitely varying in intensity, most frequently precedes the tuberculous secretion, and should be considered its most frequent occasional cause, I no longer think that the previous existence of this hyperemia is necessary to the formation of tubercle; I think that in more than one case, it is only by hypothesis it can be admitted. In my opinion, the deposition of tuberculous matter within a tissue does not necessarily require that there should have been in this tissue either an increase or diminution of vital action; there is merely a perversion of its natural powers of secretion. This perversion itself may be the product of an antecedent irritation entirely local; it may also be independent of it; it may, in a word, be connected with the general conditions of innervation and hematosis in which the individual may be placed either originally or accidentally. On this subject I refer to my work on *Pathological Anatomy*.

‡ Chemistry has recently discovered that several materials of the secretions, and even several of the elements of organs, exist ready formed in the blood (urea, cerebrine). On the other hand, some facts would tend to make us admit that pus reabsorbed from an abscess and carried into the torrent of the circulation, may be sometimes actually deposited on the surface or in the parenchyma of certain organs, without any previous inflammatory process. If then, which it is not absurd to suppose, it could be proved that the matter constituting tubercle is formed in the blood which has become diseased, as the immediate principle of the urine is formed there

5. Observation shows that tuberculous matter may be secreted either on the free surface of the bronchi, or in the cellular tissue which connects the different parts of the lung.

6. It is probable, but has not been proved, that the pulmonary lymphatic ganglions are sometimes the seat of tubercles.

7. The opinion which places the exclusive cause of tubercles in an inflammation of the white vessels, and their exclusive seat in these vessels and their ganglions, is in opposition to several observed facts.

8. The lymphatic vessels of the lung and of other organs are sometimes found filled with a matter which seems identical with the matter called tuberculous.

9. The pulmonary granulations of Bayle are not tubercles in the nascent state.

10. These granulations are red and soft, before becoming grey and hard.

11. The appearance of granulations manifests itself but artificially, after cutting or tearing the pulmonary lobules.

12. These granulations are not a new production.

13. They consist of portions of lobules, separately inflamed.*

in the healthy state, the deposition of this matter in certain organs might be conceived to take place in a manner quite mechanical without any previous congestion. We might even go so far as to admit that the deposition of tubercle, or of other accidental productions in one organ rather than in another, is connected with a modification in the physical disposition of the vessels, which carry the different elements of the blood through a sort of drawing-plate (*filière*), and effect their separation. In fine, this separation might be considered as resulting from a morbid state of the blood itself, under the influence of which the numerous materials which constitute it might be separated more easily, so that, in passing through the different organs, it should part with one or more of its elements; in one place colouring matter; here fibrin; elsewhere albumen; in other parts, some of its salts, and if it were itself diseased, new products, such as pus, tubercle, &c. In the present state of science these different ideas are but mere hypotheses; but probably they are not undeserving of examination; probably one day more profound means of investigation will give more probability to what is now but mere conjecture. It appears to me, that, in every science which does not admit immediately of mathematical application, there are two objects of study: the first is that of the facts demonstrated, and of the particular or general ideas flowing from them; the second consists in directing our attention to another series of ideas, which are as yet but conjectures more or less founded, or which even disagree with the ideas at present received. They must be considered, if I may so say, as materials in reserve, which will probably one day be taken up by more dexterous or successful hands, and which, only then, having acquired the right of circulation, will form part of the domain of science. So that it is not always useless to form hypotheses and discuss their merit, provided they be not given for truths. The existence of the materials of the secretions in the blood was a very few years ago looked on as an idea altogether chimerical. What would have happened, if some investigating minds had not taken this hypothesis into consideration? The urea would not have been found in the blood, after the removal of the kidneys; and science would not possess a fact as yet less important for itself as for the road it has thrown open to research.

* The following observations on the nature of tubercle are taken from Dr. Hope's valuable work entitled "Principles and Illustrations of Morbid Anatomy." "The physical characters of tubercle are the following: it is a body of a yellowish white colour, of variable size and form, but most commonly roundish. It is hard, but friable, in its first stage. It afterwards softens and changes into a matter composed of tender curd-like fragments suspended in a serous purulent liquid. Once broken up, tubercle tends to be eliminated, and when this has taken place, there remains, instead of the tubercle, an ulcerated cavity, which sometimes enlarges in all directions, sometimes remains unchanged for an indefinite period, and sometimes heals, either by cicatrisation or by the conversion of its interior into a healthy surface. Andral dates the existence of tubercle from the time when it presents itself in the *solid form* (Precis, i. 413); for though it is very probable that, at the moment of its deposition, it is in a liquid state, the fact has not yet been sufficiently demonstrated; and it is certain that, however small the tubercle, it is most frequently in the solid state that it is found. Certain theories date the existence of tubercle from an earlier period. Thus Dr. Baron and M. Dupuy suppose that it commences as a transparent vesicle or hydatid. Observation has demonstrated the inaccuracy

CHAPTER II.

SYMPTOMS OF PULMONARY PHTHISIS.

9. These may be divided into those which mark the onset of the disease, and those which appear during its progress.

ARTICLE I.

SYMPTOMS WHICH MARK THE ONSET OF PULMONARY PHTHISIS.

10. The study of the various ways in which pulmonary phthisis commences should be considered as very important, since it is principally during the first

of this opinion, and shown that the vesicles in question are only accidentally coincident with tubercles, and are rarely seen in the human species. (Precis, i. 408.)

"According to another theory, that of Laennec, tubercle commences as a grey and semi-transparent granulation; in the centre of which an opaque yellowish white point is sooner or later developed; and this, gradually extending, eventually pervades the whole. Before the yellow transformation has taken place, the tubercle is called *miliary* by Laennec; when turned yellow, it is his *yellow crude tubercle* (*tubercle jaune crue*, or simply *tubercle cru*). Laennec's view of the incipient state of tubercles embraces the *pulmonary granulations* of Bayle, which he, and also Louis, consider to be merely tubercles in the grey semi-transparent condition. Laennec accordingly designates them *miliary tuberculous granulations*. Andral, however, describes these as nothing more than partial peripneumony, or an inflammatory thickening and consolidation of individual air-vesicles. Although these small bodies may, like other forms of peripneumony, like false membranous granulations on serous surfaces, like hypertrophous mucous follicles, &c., suppurate, and thus give birth to tuberculous matter, presenting the appearance, as described by Laennec, of a central opaque yellowish spot; yet Andral denies that grey semi-transparent granulations are constantly and necessarily the origin of every tubercle. Were it so, the granulations should be found in all other situations where tubercle presents itself, which is not the case. (Precis, i. 411.) Cruveilhier believes that he has detected tubercles in the liquid or purulent state, having, after the injection of mercury into the veins, and its deposition in the lungs, found liquid purulent productions in the vicinity of others that were white and hard. This experiment, however, is not conclusive, as it is impossible to say how much of the effect is accidental. Leaving this controverted subject, we proceed to the consideration of tubercle, when it continues a solid, yellowish white body, opaque, friable, and without a vestige of organisation or texture.

"When in this state, a tubercle, not larger than a pin's head, may increase in magnitude to the size of an orange. How is this increase effected? According to Laennec, by intus-susception. But this process can only take place in a living organised body, which tubercle is not. It can only, therefore, augment in the same manner as inorganic bodies, namely, by juxta-position. . . . . .

"Tubercle may remain in the solid state hitherto described for a time, varying from a few weeks to a number of years. According to my observation, tubercle, infiltrated in large conglomerate masses, soon softens, since it is in general connected with a highly tuberculous or scrofulous diathesis; whereas isolated round tubercles, especially if not numerous, are those which remain the longest indolent.

"The final transformations which solid tubercle undergoes are of two kinds: — 1. Cretaceous induration; 2. Softening by suppuration.

1. "*Cretaceous induration.* — This change consists in an absorption of the animal matter and an augmented secretion of the calcareous. . . . . .

2. "*Softening by suppuration.* — Dr. Lombard, of Geneva, was the first to supply a rational theory of the process of softening, in an excellent essay on tubercles. The cause of the softening, according to him, resides no more than that of its increment in the tubercle itself. Each tubercular molecule, acting like a foreign body on the tissues with which it is in contact, occasions in every point of those tissues a secretion of pus, which *mechanically* effects

period of the disease, when we can as yet rather dread its attack than affirm its existence, that it may be either prevented, or even arrested in its progress.

11. Before the signs which announce the existence of pulmonary tubercles are observed, we may remark most ordinarily, though with variable degrees of frequency, first, a simple inflammation of the mucous membrane of the air passages; secondly, one or more attacks of hemoptysis; thirdly, an inflammation of the pulmonary parenchyma or of the pleuræ. We shall speak of these different affections in their turn, so far as they are connected with what might be called the precursors of phthisis.

12. Inflammation of the mucous membrane of the air passages, without complication of inflammation of the pulmonary parenchyma, *which may be appreciable by percussion, auscultation, and the sputa*, is certainly the affection most frequently observed in individuals who are subsequently to present signs of pulmonary phthisis. Considered with respect to its seat, its intensity, its duration, and its symptoms, this inflammation of the bronchi presents several varieties which it is important to study.

If we consider it first with respect to its seat, we shall see that inflammation of the air passages, the symptoms of which precede those of tubercles, has not always its commencement in the small bronchial ramifications, or even in the large bronchi. Far from it; we have seen it more than once commence at the upper part of the air-tube, and, for example, consist at first merely in simple laryngitis. The individuals who are in this case, and who must be distinguished from those in whom the laryngitis supervenes only at a more or less advanced period of pulmonary phthisis, have as yet presented no species of symptom which can reveal in them the existence of any affection whatever of the lung, when they become affected with an angina, which at first seems not at all

the division of the tubercle into more or less numerous parts or fragments. Softening then is nothing more than the separation or disintegration of the tubercular molecules by pus, and the final result of the process is, as in the case of a foreign body, the expulsion of the tubercle. (Precis, i. 415.) Though the softening of the tubercle most frequently commences in the centre, this is not universally the case, as has been imagined: if the tubercle be very small it commences at the circumference. By softening a cavity is formed, called a *vomica* or *cavern*."

"A tubercular excavation may heal, and the patient recover from consumption." (Laennec, Traité de l'Auscult., i. 580.)

"The healing takes place in three ways: — 1. By the surface of the cavity becoming a healthy membrane, the cavity itself remaining open. The healing process takes place as follows: — The surface of the cavity secretes a fibrinous matter, which by organisation becomes a fibro-cellular membrane. This arrests the further progress of ulceration, and, instead of pus, exhales a clear sero-mucous fluid. The fibrous portion of the membrane next thickens and tends to become cartilaginous, while the cellular portion assumes the character of a mucous membrane, and becomes continuous with that of the bronchi. 2. The second mode in which healing takes place, is by the agglutination of the walls when in the healthy condition above described, the result being a thin white fibro-cellular line, in which large bronchial tubes are found to terminate abruptly. 3. The third mode is by the fibro-cartilaginous walls gradually increasing in thickness till they fill up the cavity. The cavities left by the contraction of cretaceous tubercles very frequently become healthy, and sometimes undergo obliteration by closing on the concretions.

"It is very questionable whether tubercles can be absorbed previous to softening. Andral, judging from certain morbid appearances, is inclined to admit the bare possibility of the occurrence (Precis, ii. 545); but the majority, including Laennec, are of the opposite opinion. . . The pulmonary substance around tubercles may be healthy, indurated, or emphysematous. It is not unfrequently healthy while the tubercles are solid; but when they soften and form cavities it usually degenerates. The change consists in a thickening and condensation of the vesicular walls, rendering the structure impervious to air. It presents a compact, greyish, semi-cartilaginous appearance. In other parts the lung is infiltrated with a gelatiniform matter, rendering it impervious, though causing a less degree of induration. The higher degree of induration Laennec has described under the designation of *grey tubercular infiltration*; while the jelly-like appearance he has denominated *gelatiniform tubercular infiltration*." — Trans.

serious. However, the voice remains hoarse; the larynx is the seat of a feeling of constriction rather than of real pain; after some time the cough returns in fits, which are more distressing; the painful sensation, first limited to the larynx, extends successively to the trachea and bronchi; each fit of coughing causes a disagreeable feeling of pricking, an annoying sense of heat, sometimes even a real pain behind the sternum: here we may follow, in a manner, step by step, the progress of the inflammation, which is successively propagated from the organs of deglutition and the voice to the trachea, bronchi, and to their ramifications. It is only then the disease assumes a more serious character: the circulation becomes disturbed; nutrition begins to become altered, and very soon there can be no longer any doubt but that tubercles exist in the pulmonary parenchyma.

By attentively observing this succession of phenomena, one is led to consider that, in similar cases, the production of tubercles is consecutive on the inflammation which has attacked the mucous membrane of the larynx, trachea, and bronchi.

In other individuals the inflammation does not follow this descending course; the larynx remains healthy, and there is observed but a simple bronchitis. The latter, no more than the laryngitis just mentioned, is at first not accompanied by any serious symptom; but after it has continued for a shorter or longer time, whether suitable treatment may have been employed, or, as is too often the case, the disease has resisted the most judicious treatment, the breathing, which till then was free, becomes embarrassed, a slight febrile disturbance is set up, the patient's flesh declines, and everything announces the existence of pulmonary tubercles. Here again the tubercles appear to be developed only consecutively to the bronchitis. But what must never be lost sight of is this, that in order that inflammation of the mucous membrane of the air passages shall be followed by the production of pulmonary tubercles, it is necessary to admit a predisposition. This being admitted, it will be easily conceived, why in some a very slight bronchitis is sufficient to produce tubercles, whilst other individuals do not become phthisical after the most inveterate and intense pulmonary catarrh. In what this predisposition consists we do not at all know; we only know that it is more marked under the influence of a certain number of conditions, such as youth, the constitution called scrofulous, residence in damp situations, habitual removal from the rays of the sun, &c. It is, in fact, when one or several of these conditions exist, that we see pulmonary tubercles succeed a bronchitis most frequently and most readily; by which we do not mean to say, that sometimes also, and always consecutively to a bronchitis, tubercles may not attack a lung in conditions diametrically opposite to the preceding. Thus, for example, we have met the case of an old man, sixty-eight years of age, who, during the course of his life, had been more than once affected with rather severe attacks of bronchitis, which all terminated very favourably. This person had enjoyed good health up to the age of sixty-six. He was then attacked with a cold, which though at first slight, soon assumed an unusual degree of severity; about one year after this attack, he presented all the symptoms of confirmed phthisis, and after being some months in the La Charité, he died in the last degree of marasmus. The *post-mortem* proved the existence of numerous tubercles in both lungs. Thus, in this individual, the predisposition of tubercles, which did not at all exist during youth, did not develope itself till the period when this predisposition most usually ceases to exist.

It is not always after a first or second bronchitis that the symptoms of pulmonary phthisis are seen to develope themselves. There are individuals who, during a long space of time, often even for several years, contract bronchitis very readily. In them, one of these inflammations scarcely terminates, when,

under the influence of the slightest cause, another recommences. These persons, thus subject to *catch cold* for a longer or shorter time, should be divided into two classes with respect to the symptoms which accompany their cold, or which remain in the interval. In the first class we place those who, notwithstanding the frequent attacks of bronchitis, with which they are affected, still retain an excellent state of health: above all, their breathing is not impeded nor is their nutrition altered. However, a period arrives when a new bronchitis sets in, more severe and of longer continuance than those which preceded; then, for the first time, the health begins to become deranged; the bronchial inflammation is indefinitely prolonged, and after some time all the symptoms of pulmonary phthisis are seen to appear.

In a second class, very distinct from the preceding, we must rank those persons, who, subject as the foregoing to contract bronchitis very readily, differ from them very strikingly in their habitual state of health: they have what is called *a delicate constitution.* The least excess fatigues and makes them ill; they usually have very great nervous susceptibility; their pulse is often frequent, without however the temperature of the skin being at the same time raised, except in the palm of the hand, which is hotter than it should be in the normal state. Their breathing appears free when they are at rest and do not speak, and several even assert that they feel no dyspnœa; but should they speak with a loud voice, or keep up an animated conversation, they are soon observed *to be out of breath;* the same happens, if they walk quick, or ascend an inclined plane. It is remarkable that this difficulty of breathing, so easily perceived by an attentive observer, seems not to be so to a great number of the patients themselves, whether custom has rendered it imperceptible to them, or that they strive to conceal even from themselves a symptom which might alarm them: how many patients are in this latter case? Others more attentive, or more alive to the matter, complain of a greater or less difficulty of breathing, either of a continued or intermittent form, and are considered asthmatic. In fine, in all there is observed a state of emaciation, which indicates the suffering of some organ more or less important to life. However, several persons remain in this delicate state for several years; they do not suspend their ordinary occupations; they are not yet decidedly ill; they are as yet only on the threshold of phthisis. We have seen individuals who have remained in this sort of intermediate state, between health and disease, from infancy to the age of thirty or forty; then their health became decidedly impaired, new symptoms set in, and they died phthisical.

At what period did the tubercles commence to develope themselves in the two classes of persons just mentioned? In the former, it is very probable that several attacks of bronchitis succeeded each other before the existence of tubercles. In the second, on the contrary, they seem to have been developed at an early period, and it is to their presence in the lung that we must refer the severe symptoms, which became exasperated at the return of each bronchitis, and which were only mitigated, without disappearing, in the interval between each cold. But these tubercles are not numerous; they increase but slowly, and many years may elapse between the first period of their formation and the period when they shall be sufficiently numerous and sufficiently large to change a mere delicate state of health into a real disease.

In several of the cases which we have passed in review, we have been able to convince ourselves that the pulmonary tubercles were not developed till after an inflammation of the mucous membrane of the air passages, and that they were really the product of this inflammation. But in the last case just mentioned, the question of the origin of tubercles is not so easily solved, and it may be asked whether the attacks of bronchitis, so readily contracted by several individuals, far from causing the tubercles, are not an effect of them; may they

not act in the lung as foreign bodies, which by their presence might sympathetically irritate the bronchial mucous membrane? It must be acknowledged that here the precise commencement is very difficult to be ascertained. However, if in a great number of cases it cannot be doubted that the development of tubercles in the lung is consecutive on a bronchitis, either simple, as we have already seen, or complicated with hemorrhage, or inflammation of the parenchyma, as we shall see presently, analogy should incline us to admit, that in the case where we see a bronchitis and tubercles exist simultaneously, without its being possible to decide which of these two affections preceded the other, it is, as in the other cases, the inflammation of the bronchi which has produced the tubercles. A case which would certainly militate considerably against this mode of viewing the matter, would be that wherein there should be found tubercles still crude, and few in number in the lung of an individual, who, during life, had never coughed; but that a case of this kind may be available, it would be necessary that it should not only be proved that the individual did not cough a few months before death, but again, that it should be proved that he had never had a cold from the moment of his birth. Now, I do not yet know any case of this kind. We may very well conceive, that after the more or less prompt cessation of the bronchitis which has caused the formation of some tubercles, these may remain for an indefinite time stationary. In the hypothesis, on the contrary, in which it is admitted that tubercles exist previous to bronchitis and are the cause of it, it would be more difficult to conceive how tubercles could thus arise and become developed without producing some irritation of the bronchi, and consequently some cough.*

* On the opinion here given by M. Andral with respect to bronchitis being so general and influential a cause of pulmonary phthisis, we shall offer a few remarks, and in doing so shall take a cursory view of the opinions of the most distinguished pathologists on this very important subject. Two exclusive opinions divide medical men at present with respect to the causes of phthisis. Some, struck with the immense influence which general causes exercise in the production of this disease — namely, age, sex, temperament, hereditary transmission, &c., have either entirely overlooked the influence of local irritants in its production, or have considered such influence as of very secondary importance, and have accordingly altogether denied, or nearly so, that inflammation ever takes any part in causing the disease. Others, on the contrary, confining their attention too exclusively to local causes, to those which act directly on the lungs, and almost entirely overlooking those which affect the general system, have exaggerated the importance of irritation in phthisis, and have made inflammation the principal and almost sole agent in the development of tubercles. According to the former, phthisis is an *asthenic*, according to the latter, an *inflammatory* disease. At the head of those who advocate the first opinion may be placed Bayle, Laennec, Chomel, and Louis. These pathologists will have it that irritation and inflammation have seldom anything to do with the development of tubercles. To this opinion it has been objected that, according to such a theory, it is impossible to account for the concentration of tubercles in the lungs, and their predilection in a manner for these organs at a certain age. It is not easy to conceive how a constitutional disease, diffused through the entire system, can localise its effects on some one part, without the intervention of some determining cause, which cause, being admitted, must consist in an increase of the vitality of the organ, or, in other words, in its irritation. Thus we see cerebral tubercles very frequent in infancy, a period when the brain becomes the seat of a number of varied sensations, and consequently a centre of great and continued action; we observe scrofula to come on towards the seventh or eighth year, the period of second dentition, which keeps up a state of prolonged excitement around the jaws and neck; pulmonary tubercles are seen to develope themselves in the adult period of life, when the chest begins to increase and expand, and when there is an additional increase of vitality in the respiratory organs. If irritation, then, or an increase of vitality in the lungs, be necessary to localise in them the process of tuberculisation, it may be conceived that, when inflammation is developed in them, it may, *à fortiori*, determine this concentration; but irritation is, as we have seen, indispensable to the occurrence of this process, and inflammation is not; numerous facts prove that tubercles may be developed without catarrh, pneumonia, or pleuritis. It would be, however, shutting our eyes to all evidence to deny that inflammation has any share in the development of tubercles: we often observe phthisis to declare itself after repeated attacks of bronchitis and pneumonia, in individuals who, before the first attack of these inflammations, enjoyed

Let us not forget also, that with respect to the symptoms, the partial engorgements of the pulmonary lobules (vesicular pneumonia), which we have already

perfect health, and who evinced none of the external signs which announce predisposition to phthisis. We find the mucous membrane of the bronchi often inflamed in phthisical subjects, even when the tuberculous matter is not softened, and when, therefore, it cannot be said to have irritated the bronchi by contact with them. The influence of inflammation must also be admitted, by analogy with what takes place in the brain, liver, glands of the mesentery, within which all observers acknowledge that tubercles are developed under the influence of inflammation of the cerebral tissue, of the liver, or the intestinal mucous membrane. It being now evident that inflammation of the lung may give rise to tubercles in it, we shall next consider whether it is their exclusive cause.

M. Broussais is at the head of those who assert that inflammation performs the chief part in the production of tubercles. According to him, these small bodies are formed by the chronic inflammation of the lymphatic glands of the lung. MM. Bouillaud and Cruveilhier adopt nearly the same opinion. M. Andral coincides with them, except that he substitutes sanguineous congestion or *hyperemia* for inflammation. This theory, however, is as imperfect as the preceding. It is beyond all dispute that pneumonia, pleuritis, and, above all, bronchitis, can occasion the development of tubercles; it cannot be denied that they are formed very often without the intervention of these inflammations. In the first place, the facts which point out nascent tubercles scattered through a lung in a state of chronic inflammation, or developed beneath an inflamed pleura, are very rare; they are in some measure exceptional, and cannot serve as a basis to a general rule. They probably prove but a simple coincidence of the two lesions; commencing tubercles in the lung will not bring exemption from pneumonia. With respect to bronchitis, it is also often wanting, particularly at the commencement of phthisis, a period when it should be always constant, if it were true that tubercles can be but seldom developed without its intervention. We often, in fact, see patients cough at this period for a length of time without any expectoration, or any rale, and consequently without any signs of catarrh. In these cases inflammation evidently has nothing to do with the production of tubercles. The consideration of what takes place in the external parts of the body will also satisfy us that inflammation is not essential to the formation of tubercle. We every day see tuberculous masses developed in the necks of children without having been preceded by any inflammatory symptom, solely under the influence of cold and moisture, bad food, or vitiated air. In a word, will any one attempt to assert, that those persons whose bodies present at one and the same time tubercles in the brain, cerebellum, neck, both lungs, mesentery and spleen, a case of which is given by M Louis, and those tubercles in nearly the same state of development, which proves that they were formed at nearly the same time, — will any one attempt to say that these persons were attacked with inflammation in all these parts at once, when scarcely any signs of excitement were observable during life?

The consequence to be deduced from these facts, is, that the development of pulmonary tubercles requires the concurrence of two orders of causes, the one constitutional, and the other local. The former modify the general nutrition of the individuals, impoverish the blood by increasing the proportion of its serum, and diminishing the quantity of its red globules. The latter have but a limited, local, and superficial action, compared with the former. Without the former it is scarcely possible that the blood should undergo that alteration which contains, as one may say, the germs of tubercle. Without the second, tuberculisation may not develope itself; it cannot become localised; but we can conceive a state, in which this alteration of the blood, and the vitiated nutrition resulting from it, are so very considerable, and this fluid so saturated with tuberculous matter, that the slightest cause of pulmonary irritation, the mere diminution of the natural heat of the skin, which increases temporarily the perspiratory action of the lung, the mere normal excitement which the lungs undergo during their increase at the period of youth, or in adult age, is sufficient to develope in this organ the process of tuberculisation; and it is in this way that those cases of phthisis arise and may be explained, which seem to be developed without any cause of irritation. What has been here said is equally applicable to the etiology of tubercles of the brain, subcutaneous tubercles, or scrofulous tumours and mesenteric tubercles.

Thus then the nature of phthisis is neither asthenic nor inflammatory. If a choice were to be made between both, the former, imperfect as it is, deserves the preference. But we can penetrate more deeply into the intimate essence of the disease, and establish a theory of it more comprehensive and more accurate. From what has been said of its causes, the nature of phthisis is composed of several elements. It consists in an alteration of the blood, in the deposition or secretion of the product of this alteration into the pulmonary parenchyma, in a vitiated nutrition of all the tissues, in the irritation which excites the concentration of the tuberculous matter within the lungs, finally in the inflammation which tubercles excite around

described, and in the centre of which we have seen tubercles arise, can very seldom be distinguished from simple bronchitis.

13. Profuse hemoptysis may take place at different periods of pulmonary phthisis; on this matter we shall speak more in detail at a future period. The species of hemoptysis which alone should engage our attention at present, is that which in several persons marks in some measure the commencement of phthisis. Whilst symptomatic of the existence of tubercles in a great number of cases, here, on the contrary, it seems to precede their formation; this was clearly seen by Morton, who designated one of his species of phthisis by the name of *phthisis ab hemoptoe*.

Among the phthisical patients observed at La Charité, several told us that their disease commenced in the following manner: — They had always enjoyed good health; their constitution was strong; they had no cough previous to their hemoptysis; all on a sudden, in the midst of a state of health very good up to that period, they were seized with a profuse spitting of blood; this ceased at the end of a shorter or longer time, and all the symptoms of phthisis gradually

them, or which, in consequence of the great irritability of the lungs, occasioned by their presence, is readily set up under the influence of the slightest cause. The alteration of the blood and of nutrition is proved, first, by the nature of the causes which produce phthisis, which, being chronic and slow, and for the most part without any direct action on the lung, act evidently on the entire system in general, and principally on the blood, the first agent of nutrition, and consequently the ordinary commencement of the modifications which deteriorate, as well as of those which strengthen it; secondly, by the serous state of this liquid, in the menses of women who are at the commencement of phthisis; thirdly, by the diminution of its entire mass, as ascertained by Lieutaud, Bartholin and Portal; fourthly, by the emaciation as well as the remarkable discoloration of the skin, the loss of strength, and general feeling of illness, which often precede for a considerable time the appearance of every symptom of phthisis, symptoms which should be referred rather to a constitutional modification than to the formation of tubercles, whose presence does not even yet excite a single sign of local irritation; fifthly, by the simultaneous development of a great number of tubercles in several organs at one and the same time, whether it may have commenced in the lung, or in the lymphatic ganglions of the neck, or those of the mesentery, a circumstance which can neither be accounted for by sympathy, since tubercles are seen at the same time in organs bearing no resemblance to each other either in texture or function, such as the mesenteric ganglions and the lungs, nor on the principle of absorption, since tubercles are found in several organs, all in the crude state. With respect to the nature of the change in the blood, it is conformable to the nature of the causes which produce it, which uniformly have the effect of increasing the proportion of the serum of the blood, and diminishing the quantity of its red globules and its exciting properties, as also to the organisation which predisposes to it; that, for instance, of women, children, and all lymphatic persons, an organisation one of the principal characters of which consists in a blood which is too serous, extremely poor and very deficient in red globules; the nature of this alteration is such also as may be expected from the analysis of tubercles, which are seen to consist of substances all found in the serum of blood, namely, chloride of sodium, phosphate and carbonate of lime, oxide of iron, and animal matter constituted in a great measure of albumen. The necessary result of this alteration of the blood is an imperfect nutrition of all the tissues which constitute the second element of the disease. The third element, consisting in the deposition or secretion of tuberculous matter within the pulmonary parenchyma, is so palpable as not to require demonstration. Some irritation of the lung, however inconsiderable, has been already insisted on as indispensable to determine the concentration of the tuberculous matter in this organ; without it, in fact, the process of tuberculisation might as well take place in any other part, and so give rise, for instance, to disease of the mesentery, or scrofula. This may be considered as a fourth element in the disease. The existence of inflammation either of the bronchi or pulmonary parenchyma, in phthisis, which has been proved as well by the symptoms as by *post-mortem* examination, is admitted by every one. Thus then an alteration of the blood and of nutrition, foreign bodies scattered through the pulmonary tissue, irritation and inflammation of this tissue, are the essential elements of phthisis. We may observe, in passing, that the nature of this change in the blood is diametrically opposite to that observed in gout, the blood of gouty persons being too rich, too much animalised, and too stimulating. Thus also these two diseases, phthisis and gout, seem in a manner to repel each other. (See Dictionnaire de Médecine et de Chirurgie Pratique, vol. ix., Article *Phthisie*, from which the substance of this note has been taken.)—Trans.

declared themselves. In other individuals, this first hemoptysis, which came on under the same circumstances, was not followed by such bad consequences; after the cessation of the spitting of blood, the cough did not continue, and they returned nearly to their former state of health; but at the end of a longer or shorter time, and always without being preceded by any cold, a second, then a third hemoptysis came on; and at length, after one of these reiterated attacks of hemoptysis, the cough continued, and the patient fell into phthisis.

Should we admit, in the cases just mentioned, that before the hemoptysis manifested itself, tubercles already existed in the lungs in the latent state? It is with difficulty I can conceive, I own, how tubercles which are considered to possess the power of irritating the pulmonary parenchyma or bronchi sufficiently to produce profuse hemoptysis, could, before the appearance of this hemoptysis, exist for a long time without so much as producing even a slight cough, I can very well understand, on the contrary, that under the influence of causes more or less appreciable, some portions of the lung become the seat of a sanguineous congestion (pulmonary apoplexy of Laennec), whence results the production of hemoptysis. If this congestion continues in one or more portions of the lung, and if at the same time the person is predisposed to tubercles, the latter will be very easily produced, and will multiply with rapidity in the midst of a part, whose nutrition has been modified in consequence of the pathological process which is set up there. This succession of phenomena being admitted, it may be understood how frequently an hemoptysis may be followed by all the symptoms of pulmonary phthisis; but it may be also understood how by the aid of proper treatment one may hope to prevent this fatal termination; it may be understood, in a word, how this termination does not take place when the predisposition does not exist. Many persons have, in fact, had one or more attacks of hemoptysis in the couse of their life, and yet have not become phthisical.

Not only the examination of the symptoms should lead one to consider a certain number of hemoptyses, or rather the organic lesion producing them, as the cause and not the effect of pulmonary tubercles; but, moreover, *post-mortem* examination supplies some facts in favour of this mode of viewing the matter: we shall cite the following: —

Case 3. — Tubercles arising in the midst of a portion of lung struck with apoplexy.

A man, labouring under chronic peritonitis, was in the hospital for nearly two months, and had not yet presented any morbid phenomenon on the part of the organs of respiration; he had no cough, and his breathing was free. One morning we found his spitting vessel full of vermilion frothy blood, which he had expectorated during the night (the preceding evening he felt for the first time some dyspnœa). The fifteen days following the hemoptysis continued very profuse, it then gradually diminished, and ultimately ceased; but the patient continued to cough, and to breathe with difficulty. Some time after the spitting of blood reappeared; the patient now, exhausted by his chronic peritonitis, soon sunk. The *post-mortem* showed in the right lung the existence of brownish red masses accurately circumscribed, constituting the lesion described by Laennec under the name of *pulmonary apoplexy*. One of these masses was strewed over with a considerable number of granulations of a yellowish white, presenting all the characters of miliary tubercles in the nascent state. Others consisted of a more liquid matter, resembling a drop of pus. In two other apoplectic masses there was merely a much smaller number of these white grains; in others, none at all were perceived. In the remaining parts of the two lungs no trace of tubercles were discovered; but a great quantity of them existed in the substance of the false membranes of the peritoneum.

In this case, do we not in a manner witness the birth of tubercles in the

lung? It was not they which caused the partial sanguineous engorgements seated in the right lung, since in most of these engorgements there was found no trace of tubercle. On the other hand, their existence seemed connected with these engorgements, since they were found only in the centre of some of the latter. The formation of tubercles was here then consecutive on the pulmonary sanguineous congestion. They were developed in that part of the lung where there existed an excess of vitality, precisely as they arose in the substance of the peritoneum in a state of chronic inflammation.

The circumscribed sanguineous engorgements of the lung, more or less similar to sanguineous infiltration of the brain so well described by M. Lallemand, are a lesion common enough in the horse. Now we have several times found in this animal, in the centre of these pulmonary engorgements, tubercles more or less numerous, such as those found in the individual whose case has been just now given; and what proves that in the horse also the formation of tubercles is consecutive, at least in several cases, on the formation of sanguineous engorgement, is that in the same lung we found several of these engorgements studded with tubercles, and others exempt from them.

It is generally admitted that hemoptysis is followed by the formation of pulmonary tubercles in weak, delicate persons, who exhibit the different attributes of the lymphatic temperament, who are disposed to scrofula, or whose chest is badly formed. This rule is far from being without exception. We have more than once seen pulmonary tubercles manifest their existence after an hemoptysis in persons apparently of a very strong constitution, having a brown skin, black hair, and whose muscular system was very well developed. Among other cases of this kind we shall cite that of a medical student, who was a really athletic make. Having recently arrived at Paris, he devoted himself with ardour, during a severe winter, to the labour of the dissecting-room, and gave up a considerable portion of the night to study. Till then he had enjoyed perfectly good health; to use his own words, he *did not even remember ever to have had a cold.* After two months' residence in Paris, he began to feel a little dyspnœa, which was attributed to a local plethora of the lungs. Towards the third month, this slight dyspnœa continuing, and without having yet had any cough, this young man was suddenly seized with a profuse spitting of blood. The hemoptysis soon ceased, but it was succeeded by a dry and very painful cough; emaciation went on rapidly, and acute phthisis terminated the life of this young man, though his constitution seemed to be such as should have preserved him from that disease.

14. There is another class of patients in whom the first origin of pulmonary tubercles does not go back, as in the preceding cases, either to a simple bronchitis, or to an hemoptysis. In them the phthisis declared itself after a pleuro-pneumonia. We have already mentioned some cases of this kind in a preceding part of the work. But an important distinction should be here laid down: in several of these patients every thing seems to announce that tubercles existed already in the lungs before the attack of pneumonia; but these tubercles, being but few in number, and making but very slow progress, occasioned but very slight symptoms. The habitual cough, slight oppression, and emaciation could only make one dread their existence. Besides, the patients did not keep the bed, they continued to attend to their usual occupations; in this state an inflammation more or less acute lays hold of the pulmonary parenchyma; it exercises almost necessarily the most mischievous influence on the tubercles; it favours their increase, accelerates their softening; so that, during the convalescence from the pneumonia, phthisis, which till then was only suspected, becomes manifest, and brings the patient to the grave, more or less rapidly.

In other individuals, every thing announced a perfectly healthy state of the lungs, when they were attacked with pleuro-pneumonia. The symptoms of the

latter are seen gradually to improve and disappear; the patient now seems convalescent. But if he be closely examined, it will be observed that his strength does not return; that his flesh, far from being restored, only diminishes more and more; the cough continues dry or accompanied with a catarrhal expectoration. Deep inspirations are now difficult; the patient, to use his own words, is easily put out of breath. However, in a considerable number of cases the dull sound has disappeared, the respiratory murmur has nearly returned to its natural state. Where then shall we find the cause of the patient's pining away, and of that aggregate of symptoms which announce the lung to be seriously affected? This cause we shall find in the development of tubercles, which, at first more or less completely latent, are indicated by signs more and more characteristic, according as their number increases. Here again is a case where the formation of tubercles succeeds beyond all doubt to an inflammatory process. Besides, in these patients it is remarkable that the development of tubercles does not impede the resolution of the inflammation of the parenchyma, as is proved by percussion and auscultation. It may only be suspected that the tubercles are commencing in a certain number of points, where the inflammatory engorgement continues. But there are other patients in whom no resolution of the pneumonic inflammation takes place; it passes into the chronic state; then the sound continues dull; the respiratory murmur continues altogether absent, or is succeeded either by bronchial respiration, or by different rales; and it is in the midst of the indurated pulmonary parenchyma that the tubercles are developed.

From this circumstance, that during life no sign announced the existence of pneumonia in an individual whose lungs contain tubercles, must we conclude that the latter are developed in the midst of a tissue exempt from all inflammation? Before answering this question, let us refer to those circumscribed lobular or vesicular pneumonias, which we have already noticed several times, and one of the varieties of which constitutes the granular phthisis of Bayle: let us remember how obscure very often, and impossible it is to obtain the diagnosis of these partial inflammations. So that tubercles may be developed in portions of lungs thus separately inflamed. It is not these tubercles then, which, by their presence, always cause the inflammations which exists around them; for close by those lobular inflammations with formation of tubercles, there are other points equally inflamed, where no trace of this morbid production is to be found, as may be seen in the following case:

Case 4. — Symptoms of simple chronic inflammation of the gastro-pulmonary mucous membrane — Partial pneumonias with development of tubercles in the midst of them.

A laceman, twenty years of age, presented the symptoms of a double chronic inflammation of the peritoneum and gastro-intestinal mucous membrane, when he entered the hospital. In addition to this, during the last six weeks of his remaining in the hospital, he coughed, and expectorated daily a considerable quantity of greenish opaque mucus (the sputa of chronic bronchitis). The chest on percussion sounded well in every part; in every part also the respiratory murmur was distinctly heard, or at most with a bronchial rale at intervals; the breathing did not appear much impeded, there was no hemoptysis; the hectic fever and all its attendant symptoms must naturally be referred to the abdominal affection, so that the cough appeared to have been occasioned solely by simple chronic inflammation of the bronchi. The patient who was now in the last stage of marasmus, became gradually exhausted, and died without a struggle.

At the *post-mortem* examination, the intestines were found united together by blackish false membranes studded with numerous tubercles. The mucous membrane of the cæcum was red and softened. The lungs presented, in several

points of their extent, portions of their parenchyma in a state of red softening (*ramollissement rouge*), which were so much the more apparent, as the pulmonary tissue surrounding them was of a yellow white colour, and not at all engorged. Only one of these inflamed masses might have been capable of containing two nuts (this was the largest); the others, on an average, equalled the size of a small nut. But what these partial pneumonias presented particularly remarkable was this; several of them were studded with small reddish granulations, which might be easily taken for small lymphatic ganglions, by reason of their colour, form, and consistence.* In other portions, equally red and friable, these bodies were replaced by granulations, which were either greyish throughout, or of a dull white in one or several points of their extent, but indifferently so in their centre or at their circumference. In other masses, which were also in a state of red hepatisation, some tubercles were seen, in some degree better formed, and larger, of a rounded or oblong shape. *Elsewhere there were found portions of lung inflamed as the preceding, but which differed from them in this, that they presented no appearance of tuberculous matter in either of the degrees just now alluded to.*

Where there was no pneumonia, no tubercle was found, except in one single point, where, in the midst of a very healthy tissue, three or four miliary tubercles were observed collected together. The bronchial ganglions were very large and tuberculated.

We have several times found in the lungs of horses these partial pneumonias, with development of tubercles in different states in the centre of some, and total absence of this accidental production in others. We concluded here, as in the human subject, that the deposition of tuberculous matter in the lung had not preceded the numerous partial inflammations presented by this viscus.

15. Shall we here allude to the numerous cases in which tubercles coming to attack the pulmonary parenchyma, during the course or towards the decline of other diseases not connected with the respiratory apparatus, the onset of phthisis is very obscure, so that it may be then overlooked for a shorter or longer time? But these cases enter into the preceding, since, eventually, the appearance of the first symptom of phthisis always succeeded either a simple bronchitis, or a hemoptysis, or a pleuro-pneumonia. Thus we have often seen cases of pulmonary phthisis commence during convalescence from gastro-enteritis. Before the attack of the intestinal inflammation, the patients had no cough, nor was there any symptom to make one apprehend in them the existence of a pulmonary affection. During the course of the abdominal affection, some presented signs of pneumonia, in others there were observed only the symptoms of a simple bronchitis. But when now convalescent, they neither recovered their strength nor flesh, and they continued to cough. The diagnosis of tubercles is then difficult, because the cough, the only local symptom with respect to the chest, is not sufficient to characterise them, and because the absence of strength, and the continuance of the emaciation, are considered as connected with the preceding disease; but while this state continues, it should make us suspect strongly the existence of an organic lesion, and if the cause does not cease, the existence of pulmonary tubercles should be dreaded. It is enough to say that this cough should not be neglected, and that we should take care, and not, as is too often done, leave the cure entirely to nature. Persons are then afraid to employ an active antiphlogistic treatment, because, they say, the patient is now weak and exhausted; but this weakness and exhaustion depend principally on the serious alteration in the lungs, and it is only by combating

* They were evidently, as we have already mentioned, portions of parenchyma more engorged than those surrounding them. Thus, in the midst of the inflamed cellular tissue, knobs or pimples (*bourgeons*) are often seen, which project above a surface uniformly red, and which consist, like the latter, of mere cellular tissue, which is only more engorged and harder.

the latter that the patient's strength can be restored. A perfect convalescence is scarcely ever accompanied by this prolonged state of debility, and it is truly remarkable how rapidly both their strength and flesh return to persons who have been a long time kept on strict diet, provided they are no longer affected with disease of any organ.

16. Among the acute exanthemata, there is one in particular after which we often see pulmonary phthisis make its appearance, — that is measles. The reason of this will be readily understood, if we reflect that in measles, much more than in small-pox or scarlatina, the bronchi are the seat of an acute inflammation. This uniformly manifests itself several days before the exanthema appears ; if the latter does not come out well, if after having appeared partially or generally, it decays prematurely, the sanguineous congestion, which ceases to take place on the surface of the body, often becomes very severe on the mucous membrane of the air-passages, the bronchitis assumes increasing intensity, and after being prolonged a shorter or longer time, symptoms of pulmonary phthisis appear.

In other patients the measles runs through its usual stages with regularity; but after it has disappeared at the end of the proper time, the bronchitis which had accompanied it in its course, does not disappear with it; the lung may become the seat of a congestion sufficient to occasion profuse hemoptysis ; and either after this simple bronchitis indefinitely prolonged, or after the spitting of blood, the lungs become filled with tubercles. We witnessed this mode of the development of phthisis after measles very strikingly marked in M. B., a lecturer in a school in Paris. As I knew this young man a long time before the attack of measles, I was thoroughly satisfied that he presented no symptom which could announce in him the existence of pulmonary tubercles. He had never coughed, nor experienced any dyspnœa ; he delivered very long lectures with a loud voice, without feeling the least fatigue. Measles spread through the establishment in which he resided; he was attacked with the disease; this ran through its stages regularly ; during its continuance he was harassed with a distressing cough, which continued after the disappearance of the eruption ; he then felt some oppression, and a vague sensation of heat internally, and of undefinable uneasiness in different parts of the chest; he then had a copious hemoptysis, which was met, though not checked, by several bleedings ; it ceased at the end of about three weeks ; but the patient continued to cough, and waste away, and died in less than a year in the last stage of pulmonary phthisis. This young man had a fine white skin, blue eyes, long eyelashes, and the cheeks habitually flushed. During the year before the attack of measles, he had suffered considerable mental distress, and his scanty means prevented him from taking sufficient nourishment.

Here, as in several other cases which we might cite, nothing can make us admit that tubercles existed already in the lung before the attack of measles ; no doubt they developed themselves consecutively to a state of inflammation, or at least of congestion of the bronchial mucous membrane, or even of the parenchyma of the lung. But it must also be admitted that at other times the measles, or, more correctly speaking, the bronchitis and pulmonary congestion accompanying it, merely stimulate the process of tuberculisation, of which the lungs were already the seat before the attack of the exanthema. This process was announced by a group of local or general symptoms more or less marked ; but it went on slowly, and as yet had exercised but little influence over nutrition properly so called. Does the measles then supervene? In several cases it developes itself but imperfectly ; it seems that the old morbid process seated in the lung is opposed to the completion of the new process, which has a tendency to take place on the skin. But from this moment the tubercles become multiplied, they soften rapidly, so that a pulmonary phthisis which had lasted a con-

siderable time, without having produced any alarming symptoms, may thus be suddenly changed into a real acute disease. We shall not then repeat with several writers that acute cutaneous eruptions, and particularly measles, should be considered as exercising an influence often favourable on pulmonary phthisis, by the species of revulsive process which they occasion. I am not aware of any well-attested fact to sanction this view of the matter. I once saw, to be sure, a pleuritic effusion, which was of considerable duration, and which had resisted several means that had been employed, become promptly reabsorbed at the same time that an eruption of small-pox took place, but it is clear that the cases are not the same.

17. There are few chronic diseases which, during their progress, may not have been found to be complicated with pulmonary tubercles. The period at which the latter begin to develope themselves is then often very difficult to be ascertained, because the local symptoms may then be reduced to a simple cough which has nothing characteristic, and because, on the other hand, the symptoms of emaciation observed are naturally referred to the primary chronic affection.

18. From all the facts now mentioned it seems to follow that the forms in which pulmonary phthisis may commence are far from being identical in all individuals. But whatever this commencement may be in other respects, is the primary stage of the formation of tubercles always either an inflammation, properly so called, or an analogous process, which differs from it only in intensity, such as active sanguineous congestion, irritation, &c.? On this matter, observation informs us that, in the greater number of cases, simple inflammation of the bronchi, without the pulmonary parenchyma itself appearing to be inflamed to any great extent, so far as inflammation be appreciable either by percussion or auscultation, — observation, I say, informs us that this bronchitis precedes in the majority of cases the appearance of tubercles; that at other times the latter succeed to a pulmonary sanguineous congestion, the symptom of which is a more or less profuse hemoptysis; that in other circumstances, in fine, they are formed consecutively to an inflammation of the parenchyma of the lung itself, to a real pleuro-pneumonia, whether general or lobular. This does not prevent tubercles, when once they are formed under the influence of one or other of these affections, from being able in their turn to reproduce those same affections by the sympathetic irritation occasioned by their presence in the midst of the pulmonary parenchyma. Thus, for instance, as may be easily demonstrated (see the article on the signs furnished by percussion and auscultation), hepatisation of this parenchyma to a considerable distance from the point where the tubercle exists, follows the formation of tubercles more frequently than it precedes it; the same may be said with repect to hemoptysis; and it may be said of each of these phenomena, that it is at once both cause and effect.

19. Finally, are there cases in which it is possible to prove that the formation of pulmonary tubercles has not been preceded by any irritation, congestion, or, inflammation, either of the bronchi or pulmonary parenchyma? We have already expressed our opinion regarding the cases in which pulmonary tubercles were stated to have been found in persons who never presented the least irritation connected with the lungs. No doubt it is very possible that several of these persons may never have had either inflammation of the parenchyma of the lung appreciable by the symptoms, nor even intense bronchitis. But are there no latent irritations for the lung, as for all other parenchymatous structures, for the bronchial mucous membrane, as for all other membranous tissues? In how many circumstances, and under the influence of how many causes, do we not see the lung become the seat of very remarkable sanguineous congestions, without these congestions producing in other respects any real morbid state? But in individuals predisposed to the modification of nutrition constituting tubercle, may not

these irritations and congestions, however slight in other respects, occasion the secretion of tuberculous matter? Is it not thus that, on the external surface of the body, the development of this matter in the lymphatic ganglions is preceded by engorgement and hypertrophy of these ganglions? Is it not thus, again, that abscesses may form in some persons without having been preceded by any sign of inflammation, so that one ascertains the formation of pus not until the collection already exists under the skin. However, as in the great majority of cases, the production of pus is preceded by an evident inflammatory process, surgeons have no hesitation in considering the abscesses now in question as being equally the result of inflammation; the same reasoning may apply to the question of pulmonary tubercles. To recapitulate, I do not think that these tubercles always succeed a real inflammation; but I think it should be admitted that they are produced in a manner most frequently evident, though sometimes latent, by a process which differs from inflammation, properly so called, not in its nature, but in its degree, if I may say so. No doubt, in theory, it is easy to establish a well-marked line of demarcation between what is called active sanguineous congestion and inflammation. But examine the symptoms produced by congestion and inflammation; study the lesions occasioned by them in our organs, and you will be obliged to own that if, in a certain number of cases, an easy distinction may be established between both, in other cases also this distinction is no longer possible, so that the congestion and inflammation no longer appear to be anything but different degrees of one and the same mode of morbid action.

But if inflammation, or an analogous process, is the cause of tubercles, why does it not produce them in all individuals? This question may be reduced to this: why does inflammation sometimes terminate in induration, sometimes in suppuration, and sometimes in gangrene? Why do inflammations of serous membranes give rise to products which sometimes may be organised, and sometimes present no such appearance? Why do inflammations of mucous membranes produce in one case ulcerations which may extend in breadth or in depth, and in another case vegetations? Why do these same membranes become indurated in some and softened in others, &c.? Certainly we can no more conceive how all these alterations may be the result of an inflammatory process than we can in the case of tubercles. If we interrogate the symptoms, we shall see the signs of inflammation completely wanting for several of these alterations as well as for tubercles; this is the case of a certain number of adhesions of serous membranes, of vegetations and ulcerations of mucous membranes, &c. If, then, observation lead you to admit several species of inflammation, not only with respect to their nature, but also with respect to their results, as was done by Hunter, when he distinguished an adhesive, ulcerative, and suppurative inflammation, the strictest analogy will lead you to admit a species of inflammation, or rather process which shall differ from it only in degree, and the result of which shall be the formation of what is called tuberculous matter. (See chap. i. for what has been said on the nature of this matter.)

Here then, as in a number of other cases, we must admit a predisposition, without which tubercles shall not form, whilst, if it exist in a considerable degree, the slightest derangement in the ordinary nutrition of an organ will suffice to produce them.*

What is this predisposition? We can ascertain it in only a certain number of cases.

20. Bad formation of the chest, particularly smallness of the transverse, but, above all, of its antero-posterior diameter, is very much predisposing to phthisis.

* I already said in a preceding note, that, in my opinion, this derangement of nutrition or secretion may exist and be followed by the formation of tubercles, without having been preceded necessarily by any process of irritation.

Numerous cases have proved the accuracy of this remark; it is also easy to explain why, in a narrow chest, pulmonary tubercles must readily be produced. At the period of puberty, in consequence of the relation which connects the development of the genital with that of the respiratory apparatus, the lungs may acquire in a short space of time a considerable increase in volume, and the thoracic parietes should necessarily follow this increase. If this does not take place, if at the same time that the lungs tend to become enlarged, their bony envelope does not acquire a proportionate capacity, the pulmonary vesicles can dilate themselves but imperfectly for the reception of the air; the blood itself will not without some difficulty pass through the different vessels of the lung; the act of hematosis will be performed but incompletely; thence there will first result, as a necessary consequence, an habitual difficulty of breathing, and a disposition to aneurism of the right side of the heart. This difficulty of breathing will become increased, if under the influence of any cause whatever, whether mental emotion, or severe exercise, or bronchial irritation, &c., an increased quantity of blood flows in a given time towards the pulmonary parenchyma. A mechanical cause residing in the narrowness of the chest then prevents a greater dilatation taking place according as a greater quantity of blood comes into the lung. Is it not evident from this, that general or partial congestions have a constant tendency to take place in the lung? Thence, the modification of nutrition of this parenchyma, and, should the individual be at all predisposed, the formation of tubercles.

We shall then admit as a fact derived from observation and easily accounted for on physiological principles, that narrowness of the chest, in one or more of its diameters, predisposes to phthisis. This fact has been proved by a thousand observations; but this also must not be forgotten, and it has been equally well ascertained from observation, namely, that pulmonary tubercles often arise in persons with a broad, well-formed chest, and one that is well dilated by strong muscles.

21. To sum up, the facts stated in this article tend to confirm the opinions expressed in the first Chapter; they present to us tubercles always as a product of secretion which is often preceded by a state of hyperemia, infinitely varying with respect to its seat, intensity, and extent. From the varied combinations of these three conditions, it may arise that sometimes the hyperemia which precedes the tuberculous secretion, will be appreciable at once both by the symptoms and the *post-mortem* examination (pulmonary apoplexy, pleuro-pneumonia); that sometimes this hyperemia will be no longer appreciable except by one of these modes of investigation (bronchitis by the symptoms, lobular, vesicular pneumonia, granulations of Bayle, inflammation of the inter-lobular cellular tissue, by the autopsy); that at other times neither the symptoms nor the autopsy will point out any previous congestion (crude tubercles in the midst of a very healthy parenchyma in persons who died of an affection unconnected with the respiratory apparatus, and in whom no symptom ever announced a morbid state of the lungs or bronchi). Must we then admit that a phenomenon of which the cause is evident in nine cases, is also produced by this same cause in a tenth case, where it is no longer as manifest?

ARTICLE II.

SYMPTOMS WHICH ACCOMPANY PULMONARY TUBERCLES IN THE DIFFERENT STAGES OF THEIR EXISTENCE.

22. The symptoms most commonly observed in phthisical patients may be divided into three classes. In the first are ranged the symptoms which directly

depend on the presence of tubercles in different degrees in the pulmonary parenchyma, such as the dyspnœa, cough, mucous, purulent, or bloody expectoration; different signs furnished by percussion and auscultation. In a second class may be placed the symptoms which depend on the sympathetic disturbance which different functions undergo consecutively to the development of pulmonary tubercles, such as fever, marasmus, &c. In fine, a third class includes the symptoms which result from different diseases which may complicate the tuberculous affections of the lung, whether these intercurring diseases may have their seat in the lung itself, or in its appendages, or whether they reside in other organs. We think it right to point out here this threefold distinction; but we shall not be able to confine ourselves to it in the description which we are going to give; it seems to us more important to point out the numerous modifications which one and the same symptom may undergo according to the different morbid conditions of which we have spoken. Thus, for instance, the dyspnœa which results from the sole presence of tubercles in the lung, may be considerably increased by certain complications, such as the intercurrence of pneumonia or pleuritis, or by disease of the heart. Thus the hectic fever which belongs to pulmonary phthisis, may be very much modified in its type, severity, &c., by different affections which may supervene at different stages of the principal disease.

SECTION I.

SIGNS FURNISHED BY PERCUSSION AND AUSCULTATION.

23. Percussion of the thorax is far from giving the same information in all individuals affected with pulmonary tubercles. There are numerous varieties in this respect, which it is of importance to point out.

24. Numerous tubercles, either still in the state of crudity, or already softened, may exist in the lungs; these tubercles may give rise to all the symptoms of phthisis in the second and even in the third stage, and yet the sound yielded on percussing the parietes of the thorax may not have undergone any alteration. This perfect preservation of the sonorousness of the chest in phthisical patients is always observed, when the pulmonary parenchyma has retained its healthy state around crude softened tubercles. Now, as we have already seen, this is far from being a rare case; and, under such circumstances, it is evident that percussion cannot be of any advantage to ascertain the existence of tubercles.

25. In several patients not only does the chest when percussed retain the clear sound which exists in the normal state; but again, in a certain number of cases, the sonorousness of the thoracic parietes is actually greater than in an individual whose lungs are not tuberculated. M. Lerminier often remarks to those who follow his *clinique* this extraordinary increase of sonorousness presented by the chest in more than one phthisical patient. Sometimes then the sound in so clear, that one would be inclined to think that a gas existed in the cavity of the pleura, in a word that there was a pneumothorax.

This increase of sonorousness appears particularly to present itself under two circumstances: — 1st. When in a point of the lungs there exist an immense tuberculous excavation, into which the air penetrates freely by one or more bronchial tubes which open into it, and the parietes of which secrete but a little liquid, so that this cavity contains much more gas than pus. 2dly Though there does not exist a cavity which serves as a receptacle to a great mass of elastic fluid, this increase of sonorousness may still manifest itself in the case where a great number of pulmonary vesicles have undergone

considerable dilatation, whence results a pulmonary emphysema more or less extensive.

In the first case, the increase of sonorousness is partial. It is most usually beneath either clavicle, between this bone and the breast, in a space more or less accurately circumscribed, that the chest, when percussed, yields a sound evidently clearer than in any other part. It may also be observed in other points, and, for instance, we have ascertained more than once the existence of this extraordinary sonorousness in the hollow of the axilla, when percussed and compared with the hollow of the axilla of the opposite side, in the supra-spinous fossa, more rarely in the infra-spinous fossa. As a general principle, we may conceive that it is in the parts where cavities are most usually formed, that the partial increase of sonorousness in question should be met with. It may happen also, that this phenomenon, when sought for several days in succession, does not uniformly present itself. It ceases if the empty cavity, whose presence it indicated, comes to be filled with liquid; it reappears according as this becomes evacuated, and it continues or disappears again according to the alternate and more or less continued states of emptiness or fulness of the tuberculous cavity.

In the second case, that is to say, when the increase of sonorousness of the thoracic parietes is owing to dilatation of the pulmonary vesicles, this greater sonorousness may still be partial, as in the preceding case; so it is, when the dilatation of the vesicles itself exists only to a small extent. But it may also be general, which happens when numerous tubercles are scattered through the entire pulmonary parenchyma, and between them a great number of air vesicles are dilated. The dilatation of these vesicles permits them to receive in a given time a greater quantity of air than in the normal state; thence results, in a way entirely mechanical, increase of sonorousness of the thoracic parietes in the corresponding points. Thence also results the establishment of a sort of supplementary respiration, which may show how, in several phthisical patients, in whom a great number of pulmonary vesicles are compressed, obliterated, and occupied by tubercles, the dyspnœa is nevertheless not at all considerable. Marvellous compensation, of which we see several other examples in the system, both in health and in disease! Thus the small arteries of a limb become enlarged and dilated, when the principal artery can no longer be traversed by blood. Thus when one of the kidneys, being atrophied or disorganised, becomes incapable of secreting urine, we often see the corresponding one acquire an enormous size, etc.

It is evident that it may sometimes become difficult to decide, in cases where the two sides of the chest do not yield the same sound, whether there be really an increase of the natural sonorousness on the one side, or whether this side does not appear more sonorous, only because the other, without being as yet dull, has already lost the perfectly clear sound of the natural state. The consideration of the other signs can alone lead to the establishing of such a distinction.

There is again a circumstance which, in a considerable number of phthisical patients, might lead one to admit the existence of this increase in the sonorousness of the chest, — that is, their state of emaciation. The muscles which cover the thoracic parietes are in them so wasted, that they now merely form a thin layer interposed between the skin and ribs; in this state, the chest when percussed always yields a sound much clearer than when thick muscles cover it. This, I think, is the most frequent cause of the remarkable sonorousness presented by the thoracic parietes in several phthisical patients. With respect to the first cause, which consists in an increase in the capacity of the vesicles, it may be often rather supposed, as it is not possible strictly to prove its existence.

26. The diminution of sonorousness in the thoracic parietes manifests itself in phthisical patients principally under three circumstances : — 1st. When in a more or less extensive portion of the lung the tubercles are so multiplied, that, by coming into contact and becoming confounded, they have caused the pulmonary parenchyma to disappear. 2dly, when the substance of the lung is inflamed and indurated around the tubercles; 3dly, when the pleura becomes the seat of a liquid effusion.

The dull sound, owing to the first of these causes, is rarer than that resulting from the second. We shall now attend more particularly to the latter We have already seen that the inflammation of the portions of the pulmonary substance which surround tubercles may precede the latter ; but more frequently induration of a considerable portion of the lung, around tubercles, takes place only when they are now very numerous, softened, and replaced by caverns. This important fact may be strictly proved by the employment of percussion. In fact, in the first stages of phthisis, though numerous tubercles already exist in the lungs, the chest, when percussed, yields everywhere a clear sound ; the contrary case is an exception. Then, at this period, there is not yet any induration of the pulmonary parenchyma ; which does not mean that in the very point where the tubercle is developed, or in some of the portions of lobules which surround it, there is not already that circumscribed engorgement, one degree of which constitutes the granulations of Bayle : at a later period, according as the disease advances, and particularly when auscultation announces the existence of caverns more or less extensive, percussion detects a dull sound in different points, and principally around caverns. These being infinitely more common, as well as the tubercles to which they succeed, in the upper lobes, it is in the points of the thoracic parietes corresponding to these same lobes that the *dulness* will principally exist — namely, beneath the clavicles, between this bone and the breast, in the hollow of the axillæ, in the supra-spinous fossæ, as also superiorly in the infra-spinous fossæ.

27. M. Martinet (*Revue Médicale*, 1823) has directed attention to a remarkable modification of the sound yielded by the chest on percussion, where there exists a cavity containing at one and the same time liquids and gases. Percussion, says this skilful observer, then yields a sound similar to that resulting from the slight contact of two metals, a real *metallic tinkling*. As yet we have been able to detect this phenomenon only in three phthisical patients,* and in all three a cavern existed in the point where percussion produced the tinkling. It does not appear that this phenomenon is connected either with the extent of the caverns, with the consistence of their parietes, or with their thickness. We have not been able to discover the organic condition which favours its production.

28. In the cases where percussion affords no information, the simple application of the hand over the thoracic parietes has sometimes discovered the place where a tuberculous excavation existed, as certainly as was afterwards done by auscultation. If, in fact, we carry the pulp of the fingers over different parts of the parietes of the thorax, it will sometimes happen that in several of these points, at each word pronounced by the patient, there will be felt, at the end of the fingers, a peculiar frémissement, which will extend to a greater or less distance along the fingers and palm of the hand. The sensation, of which the fingers then become the seat, may with some correctness be compared to the sensation felt when a vibrating metallic wire is touched. The frémissement in question, not much marked, is a physiological phenomenon in several persons whose voice is loud and sonorous ; but if it is very loud, and sufficiently intense,

* Since this was written, I have several times detected a metallic tinkling where a cavern existed.

for instance, to produce in the pulp of the fingers a sensation really painful, and particularly if there is not equal intensity in the same corresponding points of both sides of the chest, it should be considered a pathological phenomenon. This inequality in the intensity of the species of vibration communicated to the fingers applied over the thorax whilst the patients speak, may be very easily distinguished below the two clavicles. In several cases where this vibratory frémissement existed to a high degree only under one of these bones, we have been able to satisfy ourselves that it announced the existence of cavities more or less considerable, surrounded by an indurated pulmonary parenchyma. This latter condition appears to us to be more essential to the production of the phenomenon of vibration in question than the greater or less extent of the tuberculous excavation seems to be. When, on the contrary, there is only induration of the pulmonary parenchyma without excavation, this sensation of vibration ceases entirely to be perceived, whilst it is still perceptible in parts where the air fills the pulmonary vesicles. The absence of vibration on one side of the thorax often suffices to diagnose the existence of a pneumonia or a pleuritic effusion on this side, before percussion and auscultation have been employed.

29. It is now acknowledged that the application of the ear over the thoracic parietes, employed for the purpose of ascertaining the different sounds or murmurs which may be produced in the lungs, affords much more information than can be given either by percussion, or by the simple application of the pulp of the fingers to the chest. With respect, however, to pulmonary phthisis, we should be far from considering auscultation in all cases as a sufficient or infallible guide. In fact, tubercles may exist in great numbers in the parenchyma of the lung, they may even be partly softened, and still auscultation may be entirely insufficient to detect their existence; and if we then confined ourselves solely to the information which it gives, a tuberculous lung would often be considered as a healthy lung. In other circumstances, even where auscultation affords a certain number of signs, these may be far from being always so well marked, that it may be possible in all cases to announce from them alone the existence of pulmonary tubercles. Will it be said that the discovery of the method of auscultation has assisted but little in the diagnosis of phthisis? Our meaning would be but ill understood if such an inference were to be drawn from what we have said. In a great number of cases, auscultation renders this diagnosis more precise and more exact; it is capable of marking the extent, the seat, and the degree of alteration of the lung much better than any other mode of investigation. More than once has it discovered tuberculous excavations in patients who seemed affected merely with slight chronic bronchitis, or at most with tubercles still crude and few in number. But a circumstance with which it is important that we should be thoroughly impressed is, that to establish a diagnosis or prognosis in a patient threatened with pulmonary phthisis, we should never place exclusive confidence in auscultation; we should certainly expose ourselves to the commission of the most serious errors if we did not at the same time pay attention to the other signs.

30. When tubercles, more or less numerous, and in different stages, exist in the lungs, they may be announced either by different modifications of the respiratory murmur, or by the existence of different rales, or, in fine, by the peculiar reverberation of the voice in one or more points of the chest.

31. Laennec has very well described the peculiar bruit (le bruit *sui generis*) perceived by the ear at each inspiration, when applied to the chest of a healthy individual. This sound, which, in the preceding part of the work, we have designated by the name of *sound of pulmonary expansion*, or *vesicular respiration*, may continue to present itself in certain phthisical patients, such as it presents itself in the healthy state; at other times it is evidently weaker; at other times it acquires much greater intensity; besides, it may have retained all its

distinctness, or be more or less mixed with some rale. We shall now study those different varieties which are connected either with the different states of tubercles themselves, or with the varied changes which the parenchyma of the lung may take on around the tubercles.

32. There are in the first place cases (and they are far from being rare) in which the murmur of pulmonary expansion appears to be neither considerably increased nor diminished in intensity; at the same time its clearness is not altered; it exists, in a word, such as it is found in the healthiest persons. In no part is there heard either rale or pectoriloquy. Here, then, by auscultation alone we cannot suspect the existence of an affection of the lung. However, all the other signs seem to indicate the presence of tubercles in this organ; thus the patient is harassed with a dry and obstinate cough; he has had frequent attacks of hemoptysis; the breathing is short and hurried; emaciation makes rapid progress: every night the pulse becomes accelerated, and the skin hot, partial or general sweats even begin to take place. Certainly, though percussion and auscultation give no information in cases of this kind, what practitioner will hesitate to recognise a first stage of pulmonary phthisis? If, at this period, an intercurrent affection hurries the patient to the grave, tubercles are actually found in the lung. But these tubercles are not very numerous; they are not yet softened; and they are surrounded by a healthy parenchyma. We have been able to verify this several times. From these facts, then, we have no hesitation in concluding that, at the commencement of a certain number of cases of pulmonary phthisis, auscultation is unable to detect the existence of tubercles.

In some rarer cases these tubercles already exist in considerable numbers, several are even softened, the patients die of lung disease, and yet, a little time before death, the respiratory murmur was heard to be natural, mixed, however, most frequently with moist bronchial rales, such as exist in the slightest pulmonary catarrh.

Often, whilst on one side auscultation detects, beyond all doubt, the existence of tubercles, it discovers nothing in the other lung but the vesicular respiration of the normal state. From what we have just said, it is evident that this does not prove that the lung of this side is exempt from tubercles; it only proves that these bodies are less numerous there, and less advanced in their development; that a healthy tissue surrounds them, and finally, that on this side the bronchi, but slightly inflamed, secrete very little liquid, whence results the absence of rale.

33. In other patients the respiratory murmur is not that of the normal state: it is weaker or stronger.

34. The diminution in the intensity of the respiratory murmur can be well appreciated only when it is partial. In fact, in several persons in perfect health, the ear applied over the thoracic parietes, hears only a very slight respiratory sound, scarcely perceptible. The same happens with persons who, by deep respirations, do not render it sensibly stronger. We should beware of taking this nearly total absence of the respiratory murmur for a pathological state. Far from it, the general and uniform weakness of this murmur often indicates a very healthy state of the lungs. But it is no longer the same if the weakness of the murmur of the pulmonary expansion is not equal on both sides in corresponding points, as, for instance, under either clavicle. In patients, one of whose lungs contained at its summit numerous miliary tubercles so crowded together, that the pulmonary parenchyma between them could be scarcely distinguished, auscultation gave us no other sign of the existence of these tubercles than a perceptible diminution in the intensity of the respiratory murmur on the side where they existed. In several cases of this kind the sonorousness of the thoracic parietes did not appear to us sensibly diminished. Again, we have ascertained

weakness of the respiratory murmur, or even its total absence, in points where, after death, we found tubercles scattered in greater or less number in the midst of a pulmonary parenchyma very much indurated, and become entirely impermeable to the air. Here there was absence of respiration and dulness of sound. These assertions may be very readily verified by auscultating and percussing the portion of the chest situate below the clavicles, by way of comparison, in a certain number of phthisical patients.

The diminution in the intensity of the respiratory murmur, or its total absence in a more or less limited space, cannot then be regarded as a pathognomonic sign of tubercles, for such a phenomenon may be produced in several cases where there are no tubercles, when there is, for instance, simple chronic pneumonia, partial pleuritic effusion, or pneumothorax. Even when tubercles do exist, it is but in the smaller number of cases that they appear to be the principal cause of the diminution or absence of the respiratory murmur: this phenomenon seems attributable in particular to the pulmonary induration surrounding the tubercles.

35. Lastly, in a great number of phthisical patients, the respiratory murmur is much more intense than in the normal state, though it still retains all its clearness. This increase in the intensity of the respiratory murmur alone suffices to denote a pathological state; it proves that some obstacle is opposed either to the free entrance of the air into the air-vesicles, or to the free circulation of blood in the vessels which enter into or go from the lung. This is the only unusual phenomenon often discovered by auscultation in several persons, who present all the symptoms of pulmonary phthisis either at its commencement, or even now arrived at a certain stage, and in whose lung numerous tubercles are actually found after death. In these patients the respiratory murmur is heard with a facility and clearness which might impose on unpractised observers, and induce them to consider the species of respiratory murmur which they hear as the type of healthy respiration.

The increase in the intensity of the respiratory murmur here in question, coincides with great sonorousness of the thoracic parietes. It indicates that around the tubercles the pulmonary parenchyma has retained its healthy state to a great extent. It frequently happens that the respiratory murmur is thus clear and strong only in one lung, whilst in the other the natural murmur of respiration is replaced by different rales. On the side where the respiration has retained its clearness, it is not to be inferred that there are no tubercles, but merely that a healthy parenchyma surrounds them, and that if some tubercles are already softened there, they do not yet communicate with any large bronchial tubes. There even may be circumscribed inflammation of the parenchyma around several tubercles, and still the respiratory murmur may retain all its strength and clearness; this is what happens when those partial pneumonias exist in the centre of the lung, or being of little extent they may be readily overlooked by auscultation. In this latter case, in particular, we found a young man, twenty years of age, who, labouring under chronic peritonitis, presented no other symptom connected with the chest during his stay in the hospital, except catarrhal expectoration. The chest, when percussed, sounded well in every part. The respiration, when examined, was found to be in every part strong and clear; only in different points, and from time to time it was obscured by some mucous rale, evidently the result of a momentary accumulation of mucus in some bronchial branch. On opening the body, the two lungs presented in different points, and at a distance from their periphery, reddish hard masses, impermeable to air (red induration), contrasting by their colour and hardness with the surrounding parts, which were of a yellow white, and which were not even engorged (which rendered the distinction between the healthy and diseased parts still more perceptible). The most considerable of these masses might have contained a large

nut, the middle-sized ones a kidney-bean, and the smallest a large pea. They contained a great number of miliary tubercles. There were not more than three or four where the pulmonary parenchyma was sound. Traces of chronic peritonitis were also found with the development of numerous tubercles in the false membranes which united the intestinal convolutions together.

These pulmonary tubercles developed in a person who was not at the same time labouring under a more serious affection, might probably have given rise to more marked symptoms; for it is a grand law in pathology, that when two chronic affections are simultaneously developed, the more severe one masks and obscures the symptoms of the other. Often also persons attribute to the first some of the phenomena which may depend equally on the second. But even where pulmonary tubercles being the sole affection, the continuance of the cough, joined to other local or general symptoms, might have inclined one to suspect their existence, auscultation would not have given any other information, and consequently the tubercles would not have been revealed by it. In fact, the mere increase in the intensity of the respiratory murmur indicates, no doubt, in our opinion, a lesion of the respiratory organs; but it may be the result of a great number of different alterations of these organs. It may even manifest itself, the lungs being perfectly sound, and the alteration being seated in the heart or aorta.

It is evident, also, that the increase in the intensity of the respiratory murmur depends here, as well as the greater sonorousness of the thoracic parietes, on the kind of supplementary respiration which is established when the air ceases to enter freely into a greater or less extent of the lungs.

36. Hitherto we have directed our attention merely to the modification of intensity in the respiratory murmur with respect to its quantity. But this murmur is not only increased or diminished in phthisical patients, its real nature also is very frequently changed: the ear, applied to the chest, hears, no doubt, the air enter at each inspiration into the air-passages without the mixture of any rale; but the murmur so heard differs considerably from that which results from the free entrance of air into the vesicles of the lung; it is, in a word, no longer the murmur of pulmonary expansion, it is succeeded by other species of murmurs, or sounds (*souffles*) which cannot be confounded with it, and which sometimes indicate that the air does not penetrate beyond the bronchial tubes of a certain size, and sometimes that it enters into a larger or smaller empty cavity.

The first phenomenon is observed in a certain number of phthisical patients, whose pulmonary parenchyma is indurated to a great extent: it is this same phenomenon which is observed in many cases of acute pneumonia, and which, by reason of its seat, we have in a former part of the work designated *bronchial respiration*. It indicates merely impermeability of the tissue of the lung: it cannot serve to detect the presence of tubercles.

The second phenomenon is much more characteristic. It manifests itself when a cavity formed in a part of the tissue of the lung, not far from the surface of this organ, and containing little or no liquid, communicates with a large bronchus, through which the air may be driven with force, and in great quantity at the same time. Now, pathological anatomy teaches that, with the exception of some very rare cases, such a cavity can be only the result of a softening of tubercles; and in the same way as we have given the name of *bronchial respiration* to the murmur which is heard when the hepatised lung does not allow the air to penetrate beyond the large bronchi, in the same way, by reason of its seat, we shall designate the species of modification of the respiratory murmur now in question by the name of *cavernous respiration*. It is a sort of exaggeration of the bronchial respiration. Each inspiratory movement produces

in a circumscribed point a kind of very loud souffle, rather like to that which is produced by forcing air into a closed vessel. It is most usually under the clavicle, or in the hollow of the axilla, that this particular souffle is heard. It can only take place when the cavity where the phenomenon occurs is nearly empty of liquid; if the latter condition does not exist, the cavernous respiration is succeeded by the mucous rale. The result is, that in some individuals it manifests itself only at intervals, every time that the sac in which it occurs is emptied of the liquid which it contained. But in others it exists constantly, and one might then suppose that very little liquid is usually secreted by the parietes of the cavity. It should be heard, for instance, when these parietes, in cases of tendency to cicatrisation, come to be lined by a cartilaginous membrane.

There is but one disease, dilatation of the bronchi, in which a sort of cavernous respiration might also be heard. But this dilatation should be carried to a very high degree, in order that so marked a souffle should be produced as that which is owing to the entrance of air into a tuberculous cavity.*

This souffle seems to acquire its maximum of intensity, when the pulmonary tissue has undergone considerable induration around the cavity where it is produced. It is then, also, that pectoriloquy is most clearly heard.

37. The respiratory murmur, whether vesicular, or bronchial, or cavernous, is far from retaining its clearness in the greater number of phthisical patients. It is often replaced by different rales, arising from the mixture of the air with the liquid contained in the bronchi, or in tuberculous cavities.

Nothing is more variable than the nature of the rales heard in the chest of phthisical patients. It must be so, since most of these rales take place solely in the bronchi. Thence it may be understood that sounds of the most varied kinds must be heard, according to the quantity and quality of the liquid contained in these bronchi, according to the place which it shall occupy in the divisions of the bronchial tree, according also as the mucous membrane of the air-passages will, or will not, be thickened, ulcerated, or more or less disorganised.

In my opinion, there is no rale having its seat in a tuberculous excavation, which may not also be found in the bronchi. I have heard, for example, a real gurgling (*gargouillement*), entirely analogous to that which is produced in large caverns, in phthisical patients whose lungs presented after death but very small cavities, which had not occasioned this gurgling; the latter then had its seat in the bronchi. I have also heard it in individuals whose lung was found to be free from tubercles, and who had but mere chronic bronchitis.

From these facts it follows that the species of rale known by the name of *gurgling*, cannot, any more than the other rales, be considered a truly pathognomonic sign of pulmonary phthisis. However, it must be observed that if one of the lungs contain much more tubercles than the other, it is usually on the side where the tubercles are most numerous that the rale is most marked; but that depends solely on this circumstance, than on the side where the greater number of tubercles exists, there is more severe bronchitis: this rale then becomes a sign, which is not devoid of importance in detecting the principal seat of tubercles; but it is evident that it is not occasioned by them. We may further remark, that if in a determinate point of the chest where caverns most usually exist, under the clavicles for example, there be heard a constant rale more or less analogous to gurgling, we shall be able thence to infer that this rale has actually a cavern for its seat; provided, however, that the existence of the other signs announces the existence of pulmonary phthisis. But here it is evi-

* See in the preceding part of this volume some cases of dilatation of the bronchi, in which one of the most remarkable symptoms was a peculiar *souffle* heard at each inspiration.

dent that such a diagnosis rests only on a mere calculation of probabilities, founded on this, that, in a subject who presents all the signs of advanced phthisis, cavities must probably exist in the summit of the lungs. This is so true, that if a precisely similar rale be heard behind the thorax to a great extent, which is far from being rare, we shall cease to consider it as the sign of a cavern ; we shall refer it to an accumulation of mucus in the bronchi, and correctly so ; however, I repeat it, the sensation to the ear will be the same, but we shall interpret it differently.

This gurgling is not the only species of rale heard in phthisical patients. There is often heard also either a simple mucous rale, which seems to be but a minor degree of gurgling, or the crepitous rale, which also differs from the preceding only in appearing to have its seat in the smaller bronchi or in the pulmonary vesicles, as has been already stated. Often, again, none of these rales is very distinct ; but, in auscultating the chest, it is discovered that in one or more points, sometimes through the entire extent of one lung, or even in both, the respiratory murmur is not clear, as if the air, having arrived in the small bronchi, could not penetrate there but with difficulty : if, then, the patient breathes more deeply, a crepitous or mucous rale is heard ; it seems that in this case a certain effort on the part of the patient is necessary that the air may traverse the more or less viscid and thick liquid, which obstructs the bronchial tubes. These different rales have their seat most frequently in the bronchi ; sometimes, however, they seem to be produced in small tuberculous excavations ; in no case can they give any certainty that the latter exist.

38. The particular resonance of the voice which constitutes pectoriloquy, is the third sign afforded by auscultation to ascertain the existence of pulmonary phthisis which has attained a certain stage. This phenomenon of pectoriloquy has been so well described by Laennec, that we cannot do better than refer to the work of this illustrious observer for a description of it.

But what is indicated by this seat, and what confidence should be attached to it ?

We readily admit that where a tuberculous excavation exists, the voice often resounds so as to produce the phenomenon of pectoriloquy ; but it is also very certain that in a great number of cases, immense caverns may exist without there being pectoriloquy. Thus then, though this phenomenon, when it does take place, indicates the presence of a tuberculous cavity, we must not conclude from its not occurring, that there are no caverns. How then does it happen that, two cavities existing of the same size and situate in the same place, pectoriloquy is very manifest in one case, and does not take place in the other ? It may be supposed that the nature and quantity of the liquid contained in the cavity, that the manner in which the bronchi open into it, may exercise some influence on the more or less evident production of the pectoriloquy. The state of the pulmonary parenchyma around the tuberculous cavity appears also to contribute very much to the more or less easy formation of this phenomenon. We think we have ascertained that pectoriloquy is particularly well marked when there is considerable induration around the cavern, a circumstance easily recognised during life by the existence of a dull sound. When this induration does not exist, pectoriloquy seems to manifest itself only when the cavity is very superficial ; when, on the contrary, there is induration, pectoriloquy may be heard, though the cavern be situated far from the point over which the stethoscope is applied ; the phenomenon of pectoriloquy then seems to be produced less in the cavern itself than in the indurated part of the parenchyma situate between the excavation and the thoracic parietes. In this case a very small cavity may give rise to very considerable pectoriloquy. Thus, for instance, one of the phthisical patients, in whom pectoriloquy was best heard under the right clavicle, presented a well-marked black induration of all the upper lobe of

the right lung, with a mixture of very many miliary tubercles. — Yet it was entirely in the posterior part, in the portion of parenchyma in almost immediate contact with the angle of the ribs, that we discovered an excavation which would scarcely have admitted a large nut. Lastly, it must not be forgotten that without there being any trace of tuberculous excavation, and by the mere fact of the existence of a considerable induration of the pulmonary parenchyma, the voice may often present a resonance which approaches more or less to perfect pectoriloquy ; it is then bronchophony, according to Laënnec's term ; but if it be true that these different phenomena are separated only by mere shades, it is easy to see how frequently they must have a tendency to be confounded, so that then they can no longer be distinguished but by a very well practised ear.

39. To recapitulate, from our researches regarding auscultation, with respect to its utility in the diagnosis of pulmonary phthisis, we think we may draw the following conclusions : —

1st. There are cases where auscultation cannot enlighten us with regard to the existence of tubercles. This happens when they are still in a state of crudity, and often too, when they are softened without constituting large cavities. Death may even be occasioned by the sole presence of tubercles, before auscultation has been able to detect their existence. Cases of this kind are far from being rare.

2d. There are other cases in which auscultation affords but doubtful signs, which by themselves would be insufficient to afford certainty that tubercles exist in the lung, but which may acquire a certain value, when they are combined with other signs ; such is the case of a great number of rales, and of several modifications of the respiratory murmur or of the voice. Among the number of those doubtful signs, we must place those which owe their value only to their seat and constancy : such is the gurgling when it is found for a continued length of time under either clavicle, or in the hollow of the axilla. It is very certain too, that this gurgling sound is not a pathognomonic sign of the existence of a tuberculous excavation, since we have often observed it in points where after death we found no accidental cavity, and where it could be produced only in the bronchi full of liquid (36). Recently we ascertained the existence of this gurgling sound in the very highest degree in all the posterior part on the right side of the chest of a young girl in whom we found no other lesion than red hepatisation of the pulmonary tissue. The patient had presented during life all the other symptoms of acute pleuro-pneumonia.

3d. The only two pathognomonic signs, in our opinion, afforded by auscultation, are, on the one hand, pectoriloquy, *when it is very evident ;* and, on the other hand, a peculiar souffle, which is heard during inspiration where the pectoriloquy exists (35). This souffle may be continued or may alternate with a gurgling sound more or less marked.

4th. It is, therefore, only when the pulmonary parenchyma contains cavities, that auscultation can afford positive information respecting the existence of tubercles ; but even in this case it does not necessarily afford them. Before this period, it can afford probabilities at the very most, which may have more or less weight, according to the accompanying circumstances, and so contribute to elucidate the diagnosis.

SECTION II.

SIGNS AFFORDED BY THE RESPIRATION.

40. After acute pleuro-pneumonia, and simple pleuritis terminating in effusion, the tubercular affection of the lungs might seem to be the disease which should

occasion most embarrassment in the breathing; yet such is not the case, and this is one of the circumstances not least remarkable in the history of phthisis, namely, the great facility with which the breathing is still performed in persons in whom more than two-thirds at least of the pulmonary parenchyma have often become impermeable to the air. It may be laid down as a general principle that, with the exception of some cases of acute inflammations of the lung or pleura, diseases of the heart disturb the respiration much more than diseases of the pulmonary apparatus.

41. We have already seen that a slight embarrassment in the breathing is a phenomenon which manifests itself in several individuals long before they present well-marked symptoms of pulmonary phthisis. It is probable that the dyspnœa, in other respects not very great, which habitually annoys these persons, depends oftentimes on the presence of some tubercles in the lung; but it is also very certain that this dyspnœa may be solely connected with the sanguineous congestion which occurs in the lung of certain persons at longer or shorter intervals, as in other persons this same congestion occurs in the brain. This simple congestion may produce hemoptysis more or less frequent, and moreover it may be justly regarded as the cause of the tubercles which are to be developed at a later period. We have had an opportunity of opening the bodies of persons placed in the two conditions now mentioned. Having died of affections not connected with the pulmonary apparatus, they had complained of having had, for a long time, a little shortness of breathing. In some, this dyspnœa was habitual; in others it appeared only at intervals. Sometimes some tubercles scattered through the lungs, the parenchyma of which was in other respects very healthy, accounted for this dyspnœa; sometimes neither the lungs, nor air-tube, presented any appreciable alteration, and we were not able to explain the dyspnœa which occurred during life, except by the existence of periodical sanguineous congestions in the lung. But even in the cases where the lung contained some tubercles, is it in consequence of intercepting the air in the points which they occupied, that they caused the dyspnœa, or rather, is it not because they occasioned a sanguineous congestion around them? This latter opinion appears the more probable. Is it not by a similar congestion that tubercles developed in the brain often produce, periodically, either convulsions, or other nervous symptoms?

42. Whilst in the patients now in question, the dyspnœa for a long time precedes the appearance of phthisis, in others we already observe undoubted symptoms of pulmonary tubercles, and yet their breathing seems tolerably free; at least when they are in a state of rest, they do not complain of feeling any dyspnœa; several persons even, whose lungs are already filled with tubercles, may speak and walk for a long time without being out of breath. We lay stress on this circumstance, in order that, to lay down a diagnosis of phthisis, we may not attach an exclusive importance to the greater or less difficulty of breathing. And indeed we shall not be surprised that pulmonary tubercles, though already numerous, should cause so little dyspnœa, if we call to mind several cases which we have cited when treating of pleuritis, and in which we have seen persons able to walk, run, and lie, in every position, engage in the most fatiguing employments, though there was an immense effusion in them, in one of the sides of the chest. However, it is correct to say, that in the great majority of persons who have tubercles in the lungs, the breathing is more or less short, and deep inspirations are often impossible; if the patient wish to make them, he feels as it were an insurmountable obstacle which opposes the free entrance of air into the pulmonary parenchyma. Some persons are even conscious of the point where the air cannot enter thus freely; they say that they do not breathe in such or such a part of the lung. The dyspnœa, which is often inappreciable to the patient when in a state of rest, becomes

very manifest, from the moment he commences to exercise himself, or even, at a more advanced stage of the disease, by the mere fact of change of position in the bed. This dyspnœa is seldom carried far enough to render lying in the horizontal position impossible. It is unnecessary to say that it must increase according as the tubercles become multiplied. Some circumstances exercise a very perceptible influence on its increase or return, as, for instance, everything which has the effect of modifying the action of the nervous system. A woman, who was now in a very advanced stage of phthisis (there were caverns in the lung), was visited by a friend who endeavoured to point out to her the near approach of death, in order to induce her to make a will. Up to this period there was no remarkable dyspnœa observed in this person. But immediately after the interview now mentioned, her breathing suddenly became very much embarrassed, she passed the entire night in a state of orthopnœa. The next morning we found her in a state of commencing asphyxia; M. Lerminier had her bled immediately to a considerable extent, notwithstanding the state of exhaustion in which the patient was; her lower extremities were covered with sinapisms. In the course of the day the difficulty of breathing diminished; she again became able to lie on her back, and the day after her breathing became nearly as free as before.

This temporary state of suffocation, this species of asthmatic attack followed so soon the great excitement which the patient must have experienced, that we are perfecly right in referring it to the disturbance of the nervous system. It is, in fact, a general law in pathology, that, when this system is for a time disturbed in its action in an individual labouring under disease of some organ, it is that particularly that is made to feel the influence of the momentary disturbance, which the functions of the nervous system have undergone. This is peculiarly evident in diseases of the stomach, liver, uterus and its appendages, and even of the brain itself; in fine, of the lung and its connexions. If the woman, whose case we have now mentioned, had had chronic gastritis with symptoms little marked, it would have been on the stomach particularly that the disturbance occasioned in the functions of the brain would have acted; the epigastrium, habitually free from pain, would have become painful; vomiting would have supervened, &c. If this same patient had had an affection of the uterus, uterine hemorrhage, more or less profuse, would have been the probable result of the mental excitement; if she had had an old attack of apoplexy, a new one might have taken place, &c. But with her the lung was seriously affected, and, conformably to the law now laid down, it was the functions of this organ that were disturbed. Was the dyspnœa in this case the result of a considerable sanguineous congestion, which was produced suddenly in the lung, a kind of pulmonary apoplexy? There was no certainty of it here, because the dyspnœa disappeared without producing hemoptysis. In another individual, who was in a much less advanced stage of phthisis than in the preceding, in whom we could as yet only suspect the existence of pulmonary tubercles, we have seen a spitting of blood appear at different times after mental emotions. Here the production of a sanguineous congestion in the lung by nervous influence can no longer be called in question.

43. The introduction of aliment into the stomach is another circumstance which, in a certain number of phthisical patients, produces a considerable embarrassment in the breathing. Some feel this embarrassment as soon as ever the food has arrived in the cavity of the stomach; others do not feel it till the process of chymification has commenced, and others only after a longer lapse of time, at the period when it may be presumed that the chyle now formed begins to be mixed with the blood. How are we to explain those differences in individuals in other respects placed under the same circumstances? How explain again why, in other phthisical patients, the different periods of digestion do

not occasion any perceptible difficulty in the breathing? Let us account for it, if we will, by the variable activity of the sympathies, provided it be not forgotten that this word, which is so often employed, in many cases serves only as a cloak for our ignorance. Here, as in many other circumstances, we are forced to admit that in each individual the same disease presents itself with symptoms more or less variable, without our being able frequently to give a satisfactory reason for this remarkable inconstancy of morbid phenomena, the organic cause materially appreciable seeming to be in other respects precisely the same.

44. The period of menstruation, in women affected with pulmonary tubercles, is also sometimes marked by a considerable increase in the difficulty of breathing, whether the menstrual flux continues to take place, or may have ceased to exist. If at the same time that there is suppression of the menses, the female is pale, chlorotic, and if, on the other hand, the symptoms of pulmonary phthisis are yet but little marked, the real cause of the dyspnœa may be entirely overlooked. Mere secondary attention is paid to the dry or moist, and in other respects slight cough, which exists for a longer or shorter time; no other local symptom as yet reveals the existence of pulmonary tubercles; the emaciation which is going on, the paleness of the face, are considered as connected with the suppression of the menstrual flux, and it is on this same suppression that the periodical dyspnœa is made to depend. But more evident symptoms of the pulmonary affection soon appear: then the difficulty of breathing becomes habitual; only it continues to be much more considerable at each menstrual return. Can its real cause be thenceforward mistaken? May we not refer these periodical exasperations of dyspnœa to the sanguineous congestion, which takes place every month around the pulmonary tubercles, which have a tendency to draw to them the fluxion which, in the normal state, should be directed towards the uterus? In cases of this kind the pulmonary affection is a sort of revulsive too powerful for us to be able to expect a re-establishment of the menstrual discharge. However, we might hope to diminish and even to check the periodical dyspnœa in question, by exciting every month an artificial discharge of blood towards the genital parts. By this method, we might fulfil a double object: first, diminish a symptom very painful for the patient; secondly, put an obstacle to the progress of the tubercles, the number of which can only be increased by the periodical sanguineous congestion, of which the pulmonary parenchyma is in some measure habituated to be the seat.

45. The greater or less rapidity, with which pulmonary tubercles are developed, is one of the circumstances which influence most perceptibly the state of the respiration. In persons whose disease makes but very slow progress, the respiration is generally but little embarrassed; it is less free in those whose tubercles are become multiplied, or are softened more rapidly. Finally, when the pulmonary phthisis takes on an acute process, when in a very short space of time the two lungs come to be filled with tubercles, the difficulty of breathing may then become the most prominent symptom, or become one of the direct causes of the very prompt death of the patient. Here, also, two cases may present themselves; either caverns are formed in very little time in the pulmonary parenchyma, and then the ordinary symptoms of phthisis coincide with the great dyspnœa; or else the tubercles are multiplied very rapidly without becoming softened; around them the pulmonary parenchyma may remain healthy; whilst things remain in this state, auscultation and percussion give no information; the expectoration presents nothing characteristic; the disturbance of the circulation does not present itself under the form of the ordinary hectic of phthisical persons. There no longer remains then any thing but the great embarrassment of the breathing, as a local symptom of pulmonary tubercles.

But for this very reason that so severe a dyspnœa is not ordinarily observed in phthisical patients, and because in other respects the aggregate of the symptoms observed is not that which marks in most patients the existence of pulmonary consumption, the latter may be very readily overlooked; in several cases of this kind, for want of an appreciable local lesion during life, the existence of a spasmodic or nervous asthma was believed in; at other times, the simultaneous appearance of some palpitations of the heart, must naturally lead observers to refer the symptoms which they observed to an organic affection of the heart. The following is one of those cases in which the development of pulmonary tubercles was announced only by a suffocation which was constantly increasing, by a species of acute asthma.

Case 5. — Very rapid development of pulmonary tubercles producing the state of suffocation such as is observed in heart disease.

A medical student, habitually enjoying good health, was seized towards the middle of the month of March, 1822, with a little dyspnœa and some symptoms of plethora. Soon after he had diarrhœa, which ceased at the end of a few days, and an increase of the dyspnœa; there was fulness of the pulse; he took violent exercise for the purpose of diminishing the plethora, to which the symptoms felt by the patient were referred. On the 29th of March and the following days, he had hemoptysis; thenceforward he had fever, cough, and orthopnœa, not at all proportioned to the slight pulmonary catarrh: pulsations of the heart strong and extended; leeches to the anus the 3d of April; cessation of the hemoptysis on the 4th; the oppression increased; lips violet coloured. From the 4th to the 10th of April the patient presented most of the symptoms indicating disease of the heart, except infiltration; he died in the state of suffocation which characterises this affection. The numerous bleedings and revulsives employed, brought but momentary relief. The autopsy detected no other lesions, but very small tubercles developed in great quantities in the two lungs, and surrounded by a crepitating and perfectly healthy tissue.

Thirty days did not elapse in this case between the appearance of the first morbid symptoms and the period of death. Will it be admitted that the pulmonary tubercles existed before the month of March, and shall we consider the great dyspnœa in the progress of which the patient died as wholly independent of the tubercles as a mere nervous phenomenon? But up to that period nothing could cause a suspicion of the existence of these tubercles; and when anatomy discovers a material cause of disease and death, it seems to me unphilosophical to endeavour to substitute another cause for it, which is at most but probable and purely conjectural. There is nothing unreasonable in admitting that in less than a month the two lungs could have become filled with so great a quantity of tubercles.

I have seen the skin become covered with a vast number of small cancerous tubercles in an individual labouring under an internal cancerous affection. We every day see enormous cancerous tumours, when extracted by the knife, again shoot forth with still greater rapidity. The possibility of this rapid development of the pulmonary tubercles being once admitted, we may readily understand how, in consequence of this sudden development, the parenchyma of the lung had not, as it were, time to become habituated to their presence. Thence arose the dyspnœa, the constantly increasing intensity of which ultimately produced death by asphyxia. Thus there is a very great difference with respect to the general and local symptoms, between a pleuritic effusion, which increases but slowly, and that which, though less considerable, takes place more rapidly. Thus also in phthisical patients, in whom the greater part of the pulmonary tissue is become impervious to air, the breathing is still much less embarrassed

than in persons who, labouring under acute pneumonia, have but a small portion of one of the two lungs hepatised. We shall not dwell longer on this subject here, as we shall have an opportunity of returning to it when treating of the progress of phthisis.

46. Finally, the state of the breathing in phthisical patients is modified more frequently and more considerably by different affections of the lung or its appendages, which complicate pulmonary tubercles, than by any of the preceding circumstances. If, for instance, in phthisical patients whose breathing is habitually but little embarrassed, the inspiratory movements are observed suddenly to become accelerated at the same time that the fever increases, there is every reason to apprehend acute inflammation of the pulmonary parenchyma around the tuberculous engorgement. An antiphlogistic treatment, the activity of which is proportioned to the state of the patient, puts a stop to this intervening inflammation, and at the same time the respiration returns to its original state. At other times the pneumonia does not yield, but passes into the chronic state, and from that time the dyspnœa which it had occasioned in its acute state, ceases almost as completely as if it had terminated by resolution. It is in fact a remarkable circumstance that the induration, a consequence of chronic inflammation, which at a certain period of phthisis exists almost always around tubercles, seldom occasions more dyspnœa than is observed in cases where the tubercles are surrounded by a healthy tissue.

The close cellular adhesions so frequently uniting the pleuræ costales and pulmonales in phthisical patients, seem to exercise no influence on the more or less free state of the breathing.

With respect to effusions into the pleura, which are much less frequent than adhesions in this class of patients, they most commonly announce their existence by a remarkable increase of the dyspnœa.

There are some phthisical patients in whom, though there may be neither considerable induration of the pulmonary parenchyma, nor effusion into the pleuræ, the breathing is habitually more embarrassed than in others in whom the lungs and their appendages appear to be placed in nearly the same conditions. The speech, in such persons, is short and panting; lying in the horizontal posture is most frequently impossible, under pain of suffocation. At the same time they exhibit a disposition to puffiness of the face, and infiltration of the limbs. The cause of this particular dyspnœa no longer depends, in this case, solely on the lesion of the respiratory apparatus; it indicates the complication of an organic affection of the heart, which sometimes existed prior to the pulmonary tubercles, and sometimes is developed subsequently to them. (On this subject see the article treating of the complications of phthisis in a subsequent part of the work.)

47. It is generally known that in persons, one of the sides of whose chest is the seat of a considerable effusion, this side often remains immoveable during inspiration. (See preceding part of this volume.)

In pulmonary phthisis a phenomenon still more remarkable is observed: that is the immobility, or at least the less dilatation of a more or less extensive part of one of the sides of the chest, where the tubercles are crowded in great numbers. This more or less complete immobility of a part of the thoracic parietes is particularly evident in certain phthisical patients beneath one of the clavicles, between this bone and the breast. It is not with the existence of vast tuberculous excavations that this partial deficiency in the movements of the ribs most frequently coincides, but with the existence of chronic pneumonia, formed around crude tubercles in greater or less numbers, or around small caverns. This partial immobility of the ribs coincides most usually with a dull sound. Where the ribs have lost their ordinary motion, or execute it but very feebly, the thoracic parietes seem depressed; but this depression, which is only appa-

rent, and which is owing the deficiency of dilatation, should be distinguished from the real depression sometimes observed when a cavern, which has become cicatrised, exists. Then the ribs sink in order to follow the lung which is depressed, just as we see them depressed in consequence of the pleuritic effusion which is reabsorbed, in the case where some circumstance has prevented the lung from returning to its original volume.

This partial immobility of some ribs is not devoid of interest in a physiological point of view. Does not this fact prove that in inspiration the ribs can move independently of each other, and that they have not merely a common motion? If, as we have often seen in phthisical patients, the lower ribs can still move when the upper ribs are immoveable, this proves that independently of the action of the scaleni muscles, which we do not deny in the ordinary state, the intercostal muscles are capable of taking an active part in the act of inspiration. With respect to the action of the scaleni, as inspiratory muscles, we have often perfectly well ascertained it in certain emaciated phthisical patients, whose respiration was embarrassed.

In persons in good health, and in a state of repose both physical and moral, the ribs move, but in a manner scarcely perceptible, during each inspiration. In phthisical patients, on the contrary, even in those whose breathing still appears very free, we perceive the ribs to rise very perceptibly in each inspiratory movement; the manner of breathing in man then becomes similar to that in woman; but that which is physiological in the latter, is a pathological effect in the former, and is connected with a commencing alteration of the pulmonary tissue.

48. Hitherto we have considered the lesions of the respiration in phthisical patients merely in a mechanical point of view; we have seen the inspiratory movements become accelerated in the direct ratio of the obstacles to the entrance of the air with equal facility into all the pulmonary vesicles, as if, by way of compensation, the parts which remained sound and pervious, should admit as a surplus the quantity of air which is no longer admitted into the tuberculated and hepatised portions of the lung. But respiration does not consist merely in the double motion by which the air enters the lung and makes its exit from it. The essence of this function is the change of venous into arterial blood. Considered in this point of view, the respiration of phthisical patients undergoes alterations still more important to be known and duly appreciated than the derangements of its mechanical phenomena; and it is also remarkable enough that the disturbance of the latter is not always directly proportional to the disturbance of the chemical and vital phenomena of respiration. We have already, in fact, seen cases where there was observed but little dyspnœa, though a considerable portion of the pulmonary parenchyma had become impervious to the air, it being affected with chronic inflammation; in other cases, on the contrary, the dyspnœa was much greater, though the lungs contained but some miliary tubercles, more or less numerous, surrounded by a very previous parenchyma. We accounted for these differences by the difference in the progress of the disease. The influence of habit is certainly not less over certain acts of nutritive life than over those of relative life. It must be remarked again, that if less air penetrate into a lung partially indurated, less blood must be formed, so that a sort of compensation is established, and it may happen in certain cases that the quantity of air introduced into the lung is nearly proportional to the quantity of blood to be arterialised.

The two principal effects which must result from the imperviousness of a portion of the pulmonary parenchyma to air relate to the blood which passes through it: — 1st. The passage of the latter through the lung may become less free; 2dly, its change of the venous into arterial blood may be less complete. From this twofold modification which the blood undergoes through the lung in

its circulation and in its nature, certain morbid phenomena result which must for a moment engage our attention.

Bichat has proved that the mechanical obstacles to the course of the blood in the different parts of the body, and in the lung in particular, are not as numerous and as powerful as might have been supposed before the experiments of this distinguished physiologist.

In the lung, however, these obstacles are real in certain circumstances. Thus, for instance, anatomy has proved that in the species of bands formed of condensed pulmonary tissue, which traverse tuberculous cavities, large arteries or veins are found obliterated; a similar obliteration is also observed at times in large vascular bronchi which pass over the parietes of cavities. If the latter are very large, it may happen that the greater part of the large vessels of an entire lobe of the lung is thus obliterated; here then is a mechanical and real obstacle to the pulmonary circulation. Such an obstacle might even be admitted, *à priori*, when the lung is considerably indurated around tubercles, whether in the crude state, or beginning to soften, or already changed into caverns. Consider, in fact, in what state the pulmonary parenchyma then is. The greyish tint which it presents is no longer the result, as in the grey hepatisation of acute pneumonia, of mere purulent infiltration; its extreme hardness, and the dryness of its section, exclude such an idea. Here, as in many other cases, chronic inflammation has thickened and condensed the tissue of the lung; like other parts also indurated by inflammation this tissue seems to receive much less blood than in the normal state, as is proved both by its colour and its dryness, as if, at the same time that the cellular fibre which enters into its composition became more and more hypertrophied, the vessels had a tendency to become obliterated, either consecutively to the inflammation which might affect them, or in consequence of the compression to which they are subjected, or, lastly, because at the same time that the last bronchial branches being compressed, no longer receive any air, the vessels which pass over their parietes cease to convey blood to them, which could no longer find air to arterialise it.

Besides, anatomical observation can prove directly the obstruction and obliteration of a great part of the vessels of an indurated lung. Conjointly with my learned friend, Dr. Blandin, I drove a fine injection into the pulmonary artery of a phthisical patient, one of whose lungs contained in its upper lobe a tolerably extensive cavern, with considerable grey induration of the pulmonary tissue around it. The injection penetrated readily into the different parts of the lungs, except in the points where the induration existed. It was seen to stop at the boundaries which separated the latter from the portions of the lung still pervious; however, in these latter portions, the matter of the injection had passed on as far as the smallest vascular ramifications.

On the difficulty which the blood experiences in traversing the lungs, when placed in the condition now pointed out, some morbid phenomena may depend. I should not be disinclined to think that some cases of hemoptysis, owing to simple sanguineous exhalation of the bronchi, arise from an obstacle to the free passage of the blood from the different divisions of the pulmonary and bronchial arteries into the veins of the same name. One might then compare the sanguineous exhalation which takes place on the surface of the bronchi to that which several experimentalists have produced artificially on the inner surface of the intestinal canal by tying the trunk of the vena portæ. The following fact may serve to corroborate this idea: —

In the month of May, 1825, I opened the body of a horse which had been but some hours dead. A great number of the principal divisions of the pulmonary veins of one of the two lungs were filled, and as it were distended by very dense clots, partly deprived of colouring matter, and closely adhering to the vascular parietes. All the physical characters of these clots, and particularly

their adhesion to the parietes of the veins which contained them, inclined me to consider as certain, that they had been formed during the lifetime of the animal, similar in that to old clots, and seemed to progress towards the organisation sometimes found in the human veins. But in the bronchi of this same horse, and only in those which corresponded nearly to the obstructed veins, there existed a considerable quantity of frothy liquid, of a very remarkable red colour; this same liquid filled a part of the trachea.. Might not the exhalation of blood, or at least of its colouring matter, of which the bronchi of this animal were the seat, depend on the obstruction of the pulmonary veins? If, in this case, the relation of these two phenomena be looked on as probable, we should not be right in rejecting the idea that in phthisical patients the difficulty of the pulmonary circulation may occasion certain attacks of hemoptysis. We are far indeed from having anything rigorously demonstrated in this respect, and this is one of those conjectures, like several others, which ulterior researches will be able either to overturn or raise to the rank of an established truth.

From the obstacle to the free passage of the blood through the lung, stagnation of the blood in the right cavities of the heart again results as a necessary consequence; thence, probably, the more or less severe palpitations of which several phthisical patients complain at different periods of their illness; thence also, probably, the state of dilatation in which the right side of the heart of phthisical patients is also frequently found. The effects produced by the greater or less obstruction of the pulmonary arteries or veins seem to be limited here. There never results from it, for instance, a disturbance of the general venous circulation marked enough to produce dropsies of greater or less extent. Very rarely, in fact, do we observe, in phthisical patients, even mere œdema of the lower extremities; almost every time that we have observed this œdema carried to a certain degree, with or without accompanying ascites, with or without infiltration of the upper extremities, we have been able to detect the existence either of a disease of the liver, or of a disease of the heart, consecutive or not on the disturbance of the pulmonary circulation.

It is also to the difficulty of the pulmonary circulation that the red colour of the cheeks in a certain number of phthisical patients has often been attributed. This opinion does not seem to me to be well-founded. If this red tint of the cheeks was the result of the embarrassment of the circulation in the upper cava, it is evident that this tint should be so much the more marked as the disease becomes more advanced, because it is then that the pulmonary induration principally exists. Now what is observed is precisely the contrary. The circumscribed redness of the cheeks exists principally towards the commencement of phthisis, and again, even at this period, it is far from being constant: it appertains rather to the constitution called scrofulous than to pulmonary phthisis, and, in this case, we see it exist for a long time before any sign announces that the lung contains tubercles: according as these become multiplied and softened, according as the lung becomes disorganised around them, the redness of the cheeks, if it had existed, becomes gradually effaced, and is succeeded by a uniform pale tint of the cheek: it is this latter tint that is most frequently observed in the different stages of phthisis. Let us conclude then, that the redness of the cheeks of phthisical patients, a redness, moreover, which is much rarer in them than has been said, cannot be explained by the embarrassment of the pulmonary circulation. It is particularly, I repeat it, an attribute of the scrofulous constitution, and we can no more explain it in the individuals possessing this constitution, than we can tell why, in them, the nutrition of the alæ nasi, of the upper lip, and of the rami of the lower maxillary jaw, undergoes almost uniformly the remarkable modification which gives to these parts so characteristic an appearance.

It is difficult to conceive how, in a lung, which has become partially impervious to air, the entire of the venous blood which passes through it, can, as in the healthy state of the lung, entirely undergo the change which constitutes

arterial blood. If, as is very probable, the great act of hematosis takes place chiefly in the lung, it seems that in tuberculated lungs this hematosis must go on but imperfectly. Thus, then, it may be readily conceived how a period may come in phthisis when there is but very little blood continues to be formed, as is proved by the general discoloration of the muscular system, without there being any well-marked sanguineous congestion in any other tissue. To this small quantity of blood, and to the imperfect elaboration of that which does exist, we may again refer the constantly increasing deterioration of nutrition, properly so called, that extreme degree of marasmus, more marked in phthisis pulmonalis than in any other chronic disease, a marasmus which is not only the result of the complete disappearance of fat, but also of a real atrophy of several tissues, and particularly of the muscular system. Might not the remarkable attenuation which the parietes of the stomach present in several phthisical patients be nothing but simple atrophy, similar to that of the muscles, and always depending on the same cause? (See further in the article on the diseases which may complicate pulmonary phthisis.)

From the preceding considerations, it follows that the respiration of phthisical patients, at a certain stage of their disease, resembles that of certain animals, *Batrachia*, in which there is but a part of the blood brought back from all the parts towards the heart, which receives in the lungs the influence of the air; it is this partial respiration which physiologists consider as the principal cause of the low temperature of these animals. It appeared to me a matter of curiosity to ascertain whether in phthisical patients also the temperature was less raised than in other persons. I accordingly found that, in a considerable number of these patients, Reaumur's thermometer, placed under the axilla, did not rise above 29°; in some it did not go beyond 28°. This temperature, lower than that of the natural state, was moreover observed only in persons whose lungs contained a great many caverns, and were indurated in a great part of their extent. But I must say, that in other patients placed in the same conditions with respect to the lungs, the thermometer arose to between 31° and 32°, as in the healthy state.

Finally, is it not in this way we may explain the small size to which the heart is often found reduced in phthisical patients (I do not speak of the cases in which there is at the same time hypertrophy of the parietes)? This species of atrophy of the heart seems to be, like atrophy of the muscles of animal life, the result of the general deterioration which nutrition has undergone. It may also depend on this, that at a certain period of phthisis the heart no longer receives but very little blood compared to that which is sent to it in the state of health. At another period of phthisis, on the contrary, when much blood was still formed, and when obstacles to the circulation existed in the pulmonary parenchyma, the right side of the heart was dilated, and often also the parietes were simultaneously hypertrophied. Thus the vessels increase in size, which, under the influence of any cause whatever, come to receive more blood than in the normal state. At a later period this cause of increase of size no longer exists, and it may be conceived that the heart, after having been hypertrophied, may then not only return to its ordinary size, but again become atrophied, as happens to arteries or veins when traversed by a smaller quantity of blood. In this case, if I may say so, Valsalva's treatment is resorted to by nature.

SECTION III.

SIGNS AFFORDED BY THE COUGH.

49. Several authors have endeavoured to distinguish simple bronchitis from bronchitis with the formation of tubercles by the characters of the cough which

shows itself in both these affections. Clinical observations shows that there really are cases in which the cough, which manifests itself in persons attacked with pulmonary tubercles, has characters not met with in the cough produced by simple acute or chronic inflammation of the bronchi. Thus in the first stage of phthisis, when the pulmonary parenchyma is as yet studded with only crude or very few tubercles, there is observed a short dry cough, the seat of which is often referred by the patient to the larynx, because it is only in this latter organ they experience some painful sensations before and during the cough; but the physician must not deceive himself in this respect; we have often had an opportunity of observing persons, who in this way referred their cough to the larynx, as others referred the seat of the hemoptysis to this part: they could not believe that their lungs were affected, so little uneasiness did they feel in the chest: however, after death, we found a great number of tubercles in the lungs; the larynx often presented only a little redness, similar to that in the trachea and bronchi. It may be supposed that if the larynx seems to some phthisical patients to be the primary seat of several of the symptoms which they experienced, and particularly of the cough, it is because by reason of the greater sensibility of the larynx the morbid impressions are more acutely felt by the mucous membrane of this organ than by that which lines the rest of the air passages. The greater sensibility of the larnyx is not mere conjecture; first, anatomy alone should tend to make us admit it, since the larynx receives more nerves than the trachea and bronchi; but further, introduce an instrument into the air-tube of a living animal, through an opening made below the cricoid cartilage; direct this instrument upwards into the larnyx, the animal will evince its sufferings by its cries; then carry the same instrument downwards into the trachea, and even as far as below the bifurcation of the bronchi, the animal will remain almost passive.

This short dry cough, which marks the commencement of a certain number of cases of phthisis, presents again another character which must not be overlooked; it is this, that after it has ceased, it is very subject to return. The slightest cause is sufficient to recall it with the utmost facility. This sort of cough is scarcely observed in bronchitis without tubercles; but does that prove that tubercles, existing previous to the bronchitis, occasion the frequent returns of the latter? This opinion may be sustained, but it is not unanswerable; for it may just as well be conceived that the short dry cough in question may be the result of a slight primary irritation of the bronchi, and that in consequence of a particular predisposition this irritation is liable to return, as in other persons we see attacks of angina return under the influence of the slightest cause. Again it may be conceived that, consecutively to these frequent returns of bronchial irritation, tubercles may develope themselves, which, once formed, shall in their turn become a permanent cause of the slight bronchitis which had first given rise to them, and probably then only the latter will become continued.

If, then, there be great probabilities to induce one to admit that the short dry cough, remarkable for its frequent returns, of which we have just spoken, oftentimes indicates only a particular form of bronchitis which precedes tubercles, we must conclude from this, on the one hand, that this species of cough should, in a great number of cases, be considered rather as capable of exciting a dread of the development of tubercles, than as announcing their actual existence. We must also conclude, on the other hand, that a severe cough returning in distressing fits, such as is produced by an intense bronchitis, may, if it be prolonged, excite an apprehension of the ulterior development of tubercles, as well as the preceding. Thus this accidental production may also be developed in the mesentery, either after very slight attacks of enteritis, which, liable to frequent returns, announced their existence each time only by very slight and, as it were, fugitive symptoms, or after violent inflammation of the intestinal canal; only here, as in the case of the lungs, observation shows that the first case is more

frequent than the second. We dwell on these facts, because too much importance has been too often attached to the form under which a symptom presents itself, to diagnose, from this form, the existence of such or such an organic alteration.

50. At a more advanced period of the disease, several varieties are again observed in the cough. In several persons the cough remains dry for a very long time, even till death; or at least it is accompanied only by a very scanty expectoration, consisting of a small quantity of mucus. We may conceive that it must be so, when, on the one hand, no tubercle has formed a cavity, and when, on the other hand, the bronchi, being but slightly irritated, merely secrete a little more mucus than in the state of health. In a certain number of cases the cough continues to be severe; it returns in frequent and harassing kinks, which occur principally during the night or in the morning. There are some persons in whom the mere change of position in the bed, the act of speaking, or even that of drinking, brings back the cough in the form of prolonged kinks. This kind of cough cannot indicate such or such a state of the tubercles; it depends principally on the intensity of the inflammation of the mucous membrane of the bronchi. In some children affected with pulmonary tubercles we have seen the cough assume a sort of convulsive form, and all the symptoms of hooping-cough appear. In this case we found no particular lesion in the larynx which could account for this unusual form of cough, and we could attribute it only to a particular disposition of the subject.

Other phthisical patients present a phenomenon contrary to the preceding. According as their malady progresses, and the pulmonary parenchyma becomes the seat of larger caverns, their cough becomes less intense and less frequent; it no longer occurs in kinks, but merely the expulsion of each spit is preceded by a slight effort at coughing, which occasions not the least distress of the patients. Such persons then delude themselves with hopes of recovery, which hopes are vain no doubt, since, at a certain stage of phthisis, the cough usually presents those characters only when there exist in the lungs immense excavations which communicate freely and directly with large bronchial tubes.

51. Lastly, in some rare cases, of which, however, we have instances, tubercles arise and multiply in the lungs without their presence being in any way announced by cough. It is principally in the case where the pulmonary parenchyma came to be attacked with tubercles during the course of another chronic disease, or towards the end of an acute disease, that we have observed this complete absence of cough. We shall mention here the case of a young man who was affected with double chronic inflammation of the peritoneum and intestinal mucous membrane. This patient perspired copiously every morning from the head, neck, and chest: he complained from that time of a little dyspnœa. These symptoms, and particularly the partial perspirations from the upper parts of the body, induced us to suspect in him the existence of pulmonary tubercles. When interrogated in reference to this matter, he stated that a year before he had had a rather severe cold, but that for the last six months *he did not cough at all.* The sonorousness of the chest was in every part very considerable, the respiratory murmur was perfectly clear, but *stronger than in the normal state.* This latter circumstance was an additional reason for our supposing that in one or more points of the lung there existed an obstacle to the free entrance of the air into the pulmonary vesicles, and this obstacle, by reason of the sweats particularly, might consist in tubercles; but how could it be positively affirmed? The patient soon died of the abdominal affection. Up to the period of his death, nothing more was observed with respect to the chest, than what has been already noticed. The autopsy demonstrated in the intestine and peritoneum the lesions which had been announced (ulcerations in the ileum, cæcum, and colon, with tuberculous matter at the lower part of them, on their edges and around them,

reddish softening of the gastric mucous membrane, sero-purulent liquid in the peritoneum). But still further we obtained a satisfactory proof of that which had been only suspected during life; a great number of tubercles were scattered through both lungs, the size of which varied from that of a grain of millet to that of a nut; most of them were in the crude state; some presented considerable softening in their centres. Around the latter the pulmonary parenchyma presented either some red hepatisation, or well-marked engorgement; elsewhere it was healthy, crepitating, and remarkable even for the small quantity of blood it contained. It was important to examine the state of the bronchi and of the other parts of the air-tube; for since there had been no cough, it should be presumed that they should not be found to be inflamed: such was accordingly found to be the case. The mucous membrane of the larynx, trachea, large bronchi, and their ramifications, were found to be white through their entire extent.

Thus this absence of inflammation of the air-tubes might account for the absence of the cough: pulmonary tubercles may then exist without bronchitis. The preceding fact proves it; but it also teaches (and this is an important circumstance) that antecedently, at a period not very remote, there had been considerable inflammation of the bronchi, to which the primary origin of the tubercles might be referred. Thus it is that in several children, but not in all children, as M. Broussais* has too positively stated, the tuberculous engorgement of the mesenteric ganglions is preceded by all the symptoms of enteritis; but sometimes this latter ceases, and after death the intestine is found perfectly healthy, whilst the tuberculous affection of the mesentery survives the cause which produced it.

A little time after the death of the patient now mentioned, another individual of about the same age entered the hospital, who had recently arrived at Paris. He presented all the symptoms of what is called inflammatory fever: on examining the state of the different organs, there was detected in him a twofold inflammation of the mucous membrane of the bronchi and of that of the intestinal canal, an inflammation more alarming for its extent than for its severity in each of the points which it occupied. The patient complained particularly of a frequent distressing cough, accompanied with a disagreeable pricking sensation behind the sternum and under both clavicles. This man assured us that, up to the time of his coming to Paris, he had always enjoyed perfectly good health. At the end of from twelve to fifteen days, after the employment of copious bleeding, the symptoms of the gastro-enteritis disappeared, and with them the fever declined. But the bronchitis continued, the strength did not return, and every evening the patient became hot, and had a general feeling of uneasiness, as if there then occurred a slight febrile disturbance. No sign announced any affection of the pulmonary parenchyma. M. Lerminier dreaded the development of tubercles. During the fifteen days following, the cough became less and less severe, and at last it disappeared altogether. No symptom any longer announced

* It is certainly a very beautiful and a very just idea which attributes inflammation of the glandular organs, communicating more or less directly with the internal or external tegumentary membranes, to primary inflammation of the latter. Thus there is no doubt but the lymphatic glands situated in the vicinity of the mucous membranes, may become irritated consecutively to the inflammation of the latter, in the same manner as we see the lymphatic glands of the neck become swollen after erysipelas of the face or of the hairy scalp, and more so still after chronic inflammation of those same parts, as may be observed in several children affected with tinea. No doubt the salivary glands may become inflamed after stomatitis, the liver after duodenitis, the testicle after urethritis, etc.; but it is not physiological to say that such must always happen. Observation disproves this too general an assertion. Do we not every day see the subcutaneous lymphatic ganglions become inflamed, swollen, and tuberculated in a primary way? Why should it not be the same with respect to the internal lymphatic ganglions, those of the mesentery, for instance? It ill becomes our weak understanding to wish to assign precise limits to the acts of nature in the state of health as in that of disease.

the existence of bronchitis; nor did any phenomenon indicate that any organ in particular was suffering; and yet his flesh and strength declined every day; the pulse was habitually somewhat frequent, without there being heat of skin; every evening the febrile disturbance became more marked. What ailed this patient? Was it idiopathic hectic fever? But this state is at least very rare. It seems to us more conformable to observation to admit that there existed in this case some organic lesion, the existence of which was not revealed by any local symptom. Certainly, such cases are much more frequent than those of marasmus and hectic fever, of which no appreciable material cause is found after death. However, at the end of a little time, the appetite, which had returned, was again lost, diarrhœa then came on, then the patient was seized with a violent stitch in the side below the left breast, and he soon died with all the signs of a pleuritic effusion. It must be noted that in the interval which elapsed between the termination of the acute bronchitis and the commencement of the pleuritic pain, there was complete absence of cough. In the *post-mortem* examination there were found numerous miliary tubercles in both lungs, the structure of which was sound in the intervening parts. The bronchi were not examined, which we regret much, in consequence of the absence of the cough. There was considerable purulent effusion in the left pleura, softening and slight injection of the gastric mucous membrane, reddish rugosities on the internal surface of the great intestine.

If we analyse this case with respect to the succession and connexion of the morbid phenomena, we shall consider it as probable that tubercles were developed in an acute form consecutively to the intense bronchitis which complicated the gastro-enteritis at the time of the patient's entering the hospital. We cannot question the existence of these same tubercles at the period when *the cough no longer existed*, since the latter recommenced only five or six days before death, dating from the time the pleuritis commenced, and it would be absurd to suppose that tubercles could develope themselves in this short space of time. Finally, it is to the tubercles formed in the lung, and which indicated their existence by no local symptoms, that we must refer the great alteration of nutrition, and the constantly increasing wasting away presented by this patient.

52. The existence of a certain number of sympathetic coughs is generally admitted to be connected with the affection of different organs, such as the liver, stomach, uterus, &c.; thence the terms hepatic, gastric coughs, &c., given to those species of coughs which exist, say authors, without alteration of the lungs or bronchi, and which seem to be the result of a mere nervous consent of parts. I deny not the existence of this sympathetic cough; but I think its frequency has been very much exaggerated, and that in several cases of this kind which have been related, a more attentive examination would have discovered an idiopathic lesion of the pulmonary parenchyma or bronchi, which often escaped investigation so much the more readily, inasmuch as, supervening as a complication during the course of a chronic affection of the stomach or liver, it was not then announced by any well-marked symptoms. (See the article regarding the complications of phthisis.)

SECTION V.

SIGNS AFFORDED BY THE EXPECTORATION.

53. When speaking of the utility of examining the expectoration, as a sign in diseases of the chest, Van Swieten says: *Certum est quòd in variis pectoris*

morbis sputa attentam mereantur considerationem. This assertion is far from being equally accurate for all affections of the lung. The expectoration, a characteristic and true pathognomonic sign in acute pneumonia, is no longer of any value in chronic pneumonia: it affords but negative signs in pleuritis, except in the rare case where the effusion formed in the pleura has escaped through the bronchi. Lastly, in the different stages of pulmonary phthisis, it does not differ, in several cases, from the expectoration of simple acute or chronic bronchitis. However, there are certain circumstances in which the expectoration, in phthisical patients, may furnish more than one valuable hint. Most authors seem to us to have treated of it too lightly. Have the sputa, in phthisis, appeared to them not to present sure characters from which it was possible to establish the diagnosis of the disease? or did it seem to them almost impossible to find terms which could give a faithful description of it? Uncertainty in the characters, difficulty in the description — such is the double rock against which most authors seem afraid of striking. When, in fact, we give ourselves up to an attentive examination of the expectoration of phthisical patients, we arrive at this rather unsatisfactory result, namely: that the mere inspection of the sputa can afford probabilities more or less strong with respect to the existence of phthisis, but scarcely ever entire certainty. The paragraph which we are about to devote to their examination shall be but in some measure a development of this proposition. It will besides be readily conceived how uncertain must be the signs afforded by the expectoration in phthisis, if we reflect, — first, that all sputa, at the commencement of this disease, and the greater part of them, in its subsequent periods, are but a product of the bronchial secretion; secondly, that the mucous membrane of the bronchi may also yield a liquid, which, in certain cases, approaches extremely near in its appearance to the liquid formed in a tuberculous excavation.

54. Two methods have been pursued in order to distinguish the sputa of phthisis from those which belong to other diseases of the lung. Some have had recourse to the employment of chemical reagents; others, and certainly the greater number, have confined themselves to the examination of their physical properties.

55. The presence of pus in the sputa for a long time appeared to physicians a pathognomonic sign, which, once ascertained, seemed to them infallibly to announce the existence of pulmonary phthisis. But the numerous efforts which have been made to distinguish pus from mucus in the expectorated matter have proved hitherto fruitless.* Could it be otherwise? We think not. Nothing, to be sure, is more dissimilar than good pus coming from a phlegmon, and the mucus exhaled by a healthy membrane, and chemical analysis may easily point out the difference. But the distinction of these two products becomes very different indeed when we wish to submit to analysis the mucus secreted by an inflamed membrane: it is then a liquid which presents in its composition as many varieties as there may be different modes of irritation in the membrane which yields it, and which ultimately transforms itself imperceptibly into a liquid altogether resembling pus, as is seen in the inflammation of the mucous membranes of the lung, urethra, and eye. How, after that, can we hope for a constant and positive result?

We however shall now give an account of some attempts made by ourselves.

The most ancient, and the simplest experiment consists in placing the expectorated matter in contact with common water or with salt water, in which

* Even though they were effectual, we should be still as far as ever from a diagnostic mark of phthisis, as it is well known that pus is present in the expectoration when bronchial disease only exists: it is equally well known that pus in the expectoration does not form an essential character of tubercular phthisis. — TRANS.

bodies lose a greater part of their weight. It is said that the mucus floats and the pus is precipitated. We have often repeated this experiment with several kinds of pus and mucus. The pus secreted by the pleura and peritoneum fell to the bottom of the water in the form of large flocculi. We have also seen the matter taken from tuberculous cavities fall to the bottom of the water; but, different from the pus of serous membranes, it was there divided into a number of small lumps of a dull white colour: the water at the same time lost its transparence, and acquired a well-marked milky tint. After allowing the liquid to remain perfectly at rest for several successive days, it was observed gradually to recover its transparence. The water was never rendered turbid by the pus extracted from the pleura and peritoneum.

Some mucus coming from the nasal fossæ of a healthy person presented nearly the same appearance as the pus of serous membranes: it first remained suspended in the midst of the water; then, like the pus of the pleura, it fell to the bottom without dividing, and without rendering the liquid turbid.

We collected from the bronchial membrane a considerable quantity of opaque mucus, thready and mixed with bubbles of air. We saw it sometimes float in water, and sometimes remain suspended in the midst of the liquid by long filaments which extended to the surface of the latter. After a short time, the air, mixed with these filaments, which kept them on the surface of the water, disengaged itself, and the mucus was precipitated to the bottom in the form of large flocculi; at other times we saw it instantly fall to the bottom of the liquid, as real pus would have done, according to authors. Whether it floats, remains suspended, or sinks to the bottom, this mucus disturbs the transparence of the water only by great and long-continued agitation, a phenomenon the reverse of that presented by the puriform matter obtained from caverns. The liquid then acquires a slightly milky tint.

These facts being known, let us see how the sputa of simple bronchitis and those of phthisis will be affected in reference to water.

The sputa of chronic bronchitis present the same varieties in this respect as those just presented to us by the mucus collected on the surface of the bronchi. In a considerable number of phthisical patients, whose lungs contained some crude tubercles, softened or now excavated, the sputa still presented the same phenomena. But in others, whose lungs contained larger caverns, the sputa usually separated into two portions, one of which instantly fell to the bottom, disturbing the transparence of the water, and forming a white or greyish deposit, as the tuberculous matter obtained from a cavern had done. The other portion first floated; but at the end of from ten to twelve hours, it was also found to be precipitated (a result similar to that which certain species of mucus had yielded), and the transparence of the water was but slightly disturbed. These facts seemed to us to indicate, in the sputa of these patients, the existence of two given matters: first, that of mere mucus; secondly, that of a matter more or less similar to pus furnished by a tuberculous excavation. We were then curious to see what would happen if we mixed these two substances in different proportions. Accordingly, a certain quantity of softened tuberculous matter, taken from a cavern, was mixed with some mucous sputa belonging to a patient affected with acute bronchitis. Before the mixture had been accomplished, the sputa remained suspended in the water, the transparence of which was still preserved. After the mixture, they were precipitated, and the water acquired a milky appearance. Thus, in this experiment, the mucus, once mixed with the tuberculous matter, was carried to the bottom with it. In other experiments, on mixing only very little tuberculous matter with a considerable quantity of mucus, and care being taken that the mixture should be well made, no precipitate at first took place, as if in this case the mucus had retained the pus on the surface; but, by shaking them well, we saw several clots of a dull white separate from the mixture and fall to the bottom.

From these facts the following conclusions may be drawn : —

1st. In a great number of phthisical patients, the sputa are constituted only of mucosity supplied by the mucous membrane of the air-passages; but in consequence of the extremely variable qualities of this mucus, the matter of the sputa, when treated with water, may exhibit very different phenomena — it may float, remain suspended, or be thrown down ; this last circumstance cannot then suffice to demonstrate the presence of tuberculous matter in the sputa. It must be said, however, that sudden precipitation to the bottom of the water is much more common for the latter than for mucus.

2dly. In other phthisical patients the sputa are constituted of a mixture of mucus and matter supplied by softened tubercles or by caverns. When mixed with water they will be differently affected, according to the proportion and more or less intimate mixture of these two elements. However, the sudden transformation of a white precipitate, with disturbance of the transparence of the water may, in general, indicate the presence of a greater or less quantity of tuberculous matter in the sputa.

Let us follow up this subject with chemical reagents.

We have brought in contact with dilute sulphuric acid some softened tuberculous matter, pus secreted by the parietes of cavities, some sputa of phthisical patients, and those of patients labouring under simple chronic bronchitis ; finally, some mucus taken from the pharynx and nasal fossæ ; all these substances were equally dissolved. The acid first became red, then black ; its temperature was raised. If we pour on this solution a small quantity of water, the liquid assumes a greyish-white colour ; if more water be added, we perceive a copious grumous deposit gradually formed, and at the end of some hours the liquid is colourless and transparent. Darwin had stated that in this experiment the pus might be distinguished from mucus, because the first formed at the bottom of the vessel a greyish sediment, whilst the second remained suspended in the form of small flocculi. We have not remarked this difference.

Ammonia poured on the purulent matter of the cavities dissolves it rapidly. The liquid assumes the appearance and consistence of a transparent colourless jelly of great tenacity. This fact is noticed in Thomson's Chemistry as one of those which may best serve to characterise pus. The mucus is equally dissolved in ammonia, but the mixture does not assume the jelly-like appearance. On submitting the sputa of phthisical patients to this experiment, we observed this appearance only twice. In most of the cases the solution took place without the liquid increasing in consistence, whilst at other times the solution did not take place at all.

Already, since the time of Aretæus, and before him, several processes were employed to distinguish the sputa of pulmonary phthisis from those belonging to other affections of the lung ; but this great observer attached but little importance to these different processes. *Quicumque aut igne aut aquâ sputa explorant ac notant, hi haud ita multum phthoën mihi dignoscere videntur ; namque visio quolibet alio sensu certior est.*

56. We think with Aretæus, that it is chiefly to the particular appearance of the sputa, to their form, consistence, colour, odour, composition, etc. ; in a word, to the aggregate of their physical properties, that we must have regard in order to recognise the sputa which belong to tubercular degenerescence of the lungs.

57. At the onset of phthisis, when the continuance of the cough, the frequent attacks of hemoptysis, the emaciation which begins to become perceptible, the febrile disturbances which manifest themselves at intervals, seem to announce a more serious lesion of the lung than simple bronchitis, the sputa as yet present no character. A dry cough is observed in several patients ; in others it is accompanied from the commencement with catarrhal expectoration ; sometimes, also, the latter is opaque and extremely variable, as in chronic bronchitis ;

sometimes, though now having continued for a considerable time, the sputa constantly remain those of acute bronchitis ;* this latter circumstance is worthy of remark, as being one of those which may incline one to dread the existence of tubercles when nothing yet gives any certainty of them. But what must never be lost sight of is, that in this first stage of phthisis the sputa may present themselves indifferently with all the characters already noticed.

However, when the cough has now continued a certain time, and when the matter of expectoration is attentively observed every day, we observe at intervals, in the midst of the turbid mucosity which forms it, small clots (*grumeaux*) of a dull white, or bordering a little on yellow, of considerable consistence, the size of which varies from that of a very small pin's head to that of a pea. Bayle compared them correctly enough to well-boiled rice. Their existence was remarked by Hippocrates, who compared them to grains of hail. According to him they indicated phthisis, and had a great tendency to become purulent. Baglivi also strongly insisted on the presence of these whitish or yellowish granulations in the sputa of persons threatened with phthisis.

It would be easy to confound the small clots in question with others of the same size and almost similar appearance, which are often expectorated during the course of the most simple pulmonary catarrh, or which are even thrown up by persons who do not cough. We have already said in the preceding part of this volume that these clots came from the tonsils, or else that they were a mere product of the secretion of the mucous membranes of the cheeks and pharynx. No doubt they are observed much more frequently, whatever may be said of them, than those formed by fragments of tuberculous matter ; to distinguish them from one another, the great friability and cheesy appearance of the latter have been opposed to the viscidity and considerable tenacity of the former : these distinctive characters are real in a certain number of cases ; but we must not attach too much value to them. In fact, observation has proved to us, that under some circumstances, the mucosity ordinarily secreted by the follicles spread over the surface of the gastro-pulmonary membrane, may come from these follicles so altered as to present entirely the appearance of the sebaceous matter formed by the cutaneous follicles in their normal state : it may even sometimes acquire the consistence, the colour, in a word, all the physical properties of plaster (*slâtre*) saturated with water.† From these facts it follows that it is only with a certain degree of distrust that we should make the clots mixed with the sputa in question depend on tubercles, when no other sign announces the existence of tubercles.

Often again, at the onset of phthisis, or more correctly speaking, when it is only dreaded, the sputa present other peculiarities, to which greater or less importance has been attached. Thus, it is not unusual to observe long fine delicate streaks in the midst of the colourless, thready, transparent, or turbid liquid which then forms the sputa ; at other times these streaks furrow the more opaque mucus which constitutes the greater part of these same sputa, and from which they are distinguished by their dull white or slightly yellowish colour, similar to the colour of the clots already described.

In persons presenting such an expectoration we have ordinarily found the lungs filled with small tubercles, for the most part hard, some of which already commenced to soften at their centre. Sometimes we were able by careful dissection to discover very small bronchial tubes of almost capillary minuteness, which opened into the small cavity in which the tuberculous matter was contained.

* For the characters of these sputa see preceding part of this volume.

† It is in the horse particularly that we have had an opportunity of ascertaining these remarkable modifications of the matter secreted by the mucous follicles.

If we now endeavour to connect the nature of the expectoration with the state of the lung, we shall be induced to consider as probable that the sputa already contain a small quantity of tuberculous matter, which presents itself under various forms (in clots or in threads), according to its degree of softening, according to the form and size of the opening which has given exit to it. Having once reached the small ramifications of the bronchi, it may be supposed that it soon makes its way into the larger, and there mixes itself with the mucus without being confounded with it. All this is, no doubt, very admissible: but in the same manner as the clots already mentioned, the streaks or filaments which often furrow the sputa of persons considered phthisical, are far from always having their source in tubercles; we have actually observed them in cases where the autopsy proved that there was not a tubercle in the lungs, and we think that these whitish streaks, considered by several persons as a product of tubercles which are commencing to soften, are much more frequently found in small bronchial ramifications, whose secretion may differ from that which takes place in larger tubes.

58. From what goes before, it follows that as long as tubercles, even when softened, do not communicate freely with the bronchi, the sputa can furnish but very doubtful characters with respect to ascertaining the existence of phthisis. Can the expectoration illustrate the diagnosis with more certainty when the lungs are already filled with cavities? This is what we must now examine. Here two cases may present themselves: — 1st. A wide communication may be set up suddenly between a softened tuberculous mass and a bronchial tube; 2dly, this communication, at first very small, may enlarge but slowly, and the passage of the tuberculous matter into the bronchi takes place but gradually. In these two cases the sputa present themselves with a different and a more or less characteristic appearance.

The two following observations present examples of the first case: —

Case 6.—Sudden expectoration of a large softened tuberculous mass (vomica)—Death by asphyxia.

A middle-aged man, who was now in the hospital for the last fifteen days, complained of having had for a considerable time a dry distressing cough, which, joined to some dyspnœa, together with a hectic fever as yet but imperfectly marked, announced the existence of commencing phthisis pulmonalis. All at once, in the midst of a violent kink of coughing, he expectorated a great quantity of a grumous pus, the accumulation of which in the air-passages soon carried him off by asphyxia. We found the two lungs filled with miliary tubercles: some of a larger size were beginning to soften. Still further, in the midst of the upper lobe of the right lung, there was found an excavation almost entirely empty, capacious enough to contain an apple, and communicating by a broad opening with a bronchial tube, which entered almost immediately into the principal bronchus of this lung.

It is probable that in this case the matter came almost entirely from the cavity formed towards the summit of one of the lungs. The perforative ulceration of the bronchus did not take place till after the complete softening of a large tuberculous mass, so that as soon as a passsge was open to it the latter might be all at once entirely evacuated. Here the expectoration was characteristic.

Case 7.—Copious puriform expectoration suddenly occurring, and coinciding with a loud gurgling.

In another individual the phthisis pulmonalis was for a long time indicated only by some cough, with the expectoration of acute bronchitis, by frequent

attacks of hemoptysis, by dyspnœa, and lastly, by a rather rapid emaciation. The sonorousness of the thoracic parietes was everywhere perfect, and the respiratory murmur, which was very intense, was altered only by a little moist bronchial rale, which was heard in different points. Such was the state of this patient when, all at once, towards the evening, he was seized with a fit of coughing much more violent than usual, in the midst of which we had another attack of hemoptysis. The latter ceased gradually at the end of some days. But at the same time that the spitting of blood disappeared, the patient commenced to expectorate a puriform greenish white liquid in very great quantity, in the midst of which small whitish friable fragments floated, the debris very probably of a tuberculous mass. From the first day that this new expectoration manifested itself, a very loud gurgling without pectoriloquy was heard for the first time below the right clavicle, in the space included between this bone and the breast. The following days this gurgling was still heard : the expectoration continued to be copious and puriform ; but the small clots which floated in the midst of the pus during the first days were no longer found there. Henceforward the patient rapidly arrived at the last stage of phthisis, and soon died. By a rather strikingly anomaly, he scarcely had any sweats. There was found an immense cavern in the part where, during life, the gurgling was heard ; around it the pulmonary parenchyma was hardened only for the space of some lines. In the two lungs there were, besides, numerous tubercles in different stages of crudity or softening.

Here, again, the change which took place suddenly in the nature of the expectoration announced the time when a tuberculous mass, entirely softened, was discharged through a large perforation of the bronchi. In this case, the clots which floated in the midst of the expectorated purulent matter presented the most perfect analogy to the matter often found in cavities. These clots ceased to appear when the tuberculous mass was discharged, and when the matter of the expectoration now consisted merely of pus secreted by the parietes of the cavern. Observe, again, that the period at which the gurgling appeared coincided perfectly with that at which the tuberculous expectoration showed itself; this gurgling ceased not to be heard, a circumstance which announced the extreme activity of the secretion going on in the parietes of the cavern, since, though continually emptying itself, it was still constantly filled.

This sudden discharge of a large softened tuberculous mass through the bronchi is not that which most ordinarily happens ; in the greater number of cases it is only gradually that this discharge takes place, and then it is only gradually also, and in a much less striking manner, that the matter formed in the tuberculous cavity makes its exit from the latter, and is expectorated with a variable quantity of bronchial mucus with which it is usually mixed. It then becomes more or less difficult to distinguish its presence. But what term can be found to mark the infinitely varied forms which the sputa may then assume ? Their principal differences depend, no doubt — 1st, on the manner in which the bronchi communicate with the tuberculous excavation ; 2dly, on the number, length, breadth, and mode of division of the bronchial tubes which the liquid must traverse before it reaches the trachea ; 3dly, on the quantity and quality of the bronchial mucus with which it is mixed ; 4thly, on the longer or shorter time it tarries in the bronchi before it is expectorated. In several phthisical patients the substance of the expectoration is principally formed of more or less considerable masses which remain suspended in the midst of a turbid serosity. This species of sputa is designated in the La Charité by the name of *flocculent* (floconneux). In other persons the matter of expectoration is very different ; thick masses, with rounded edges, precisely circular, all equal in diameter, and continuing perfectly distinct from each other, remain on the surface of a liquid more or less turbid, somewhat resembling a solution of

gum, which is perceived in the nearly equal spaces which they leave between them. In consequence of their arrangement these have been called *nummular* sputa. Examined with the naked eye, or, what is better, by a magnifying glass, these sputa often appear formed by the union of a crowd of small points, which seem capable of again being divided into other still smaller points ; they are small molecules, somewhat like those observed when tuberculous matter more or less completely softened is treated with water. These points, of a dull white colour, are combined by a mucus which is sometimes greyish and semi-transparent, sometimes yellow and greenish, and completely opaque, so that the entire sputum appeared shaded with different colours — *variegatum*, as the ancients said. Whatever appearance these sputa assume, we conceive that we express the manner in which they form correctly enough, and that we give a tolerably just idea of their habitude when we designate them, with M. Lerminier, by the generic term, *compound sputa.*

59. The pus which fills certain cavities is remarkable for its colour, which is that of a dirty grey, ashy, and sometimes reddish ; this latter tint seems owing to a certain quantity of blood which is mixed with it. This liquid, which has much resemblance in its consistence, colour, and usually fetid odour, to the sanious pus which flows from old ill-conditioned sores, or from certain white swellings of the joints, is evidently secreted by the parietes of the caverns ; most ordinarily small clots of a dull white, the debris of the tuberculous mass, are suspended in the midst of this liquid. The sputa of several phthisical patients are sometimes formed partially or entirely of the matter just described. Being scanty at first, this matter presents itself only from time to time in isolated patches, in the midst of sputa of different appearances. By degrees it becomes more profuse, and ultimately forms them almost exclusively. Then the expectorated matter presents the greatest resemblance to the matter contained in caverns ; it is, however, always a little more consistent, which seems to depend on its mixture with bronchial mucus. It is a sort of a homogeneous, greyish or reddish porridge (*purée*), fetid or inodorous, in the midst of which there are often observed scattered some debris of tuberculous matter, such as are found in caverns.

This kind of expectoration, incontestably the most characteristic, is a sign that the patient has arrived at the most advanced stage of pulmonary consumption. We then see some phthisical patients for whom it is enough to lie on the side opposite to that on which the largest tuberculous excavations exist, to throw up instantly, and in great quantity at once, the liquid which fills them ; one would say it was a pleuritic effusion, which suddenly makes way for itself through the bronchi. One of these patients assured us that he really felt his lung empty itself, when, after having remained for some time lying on the right side, he placed himself on the left side. We found in the right lung of this person an immense cavity still half-full of the liquid of which the sputa consisted, and communicating with a very large bronchial tube, which poured it almost directly into the trachea.

We should mention, however, that we have sometimes opened phthisical patients who had presented the preceding expectoration, and in whose lungs no great cavity existed. But in this case we have uniformly found a number of small excavations filled with a matter similar to that of the sputa, and communicating with bronchi of a greater or smaller size. They were numerous enough to be considered as the source of the copious expectoration which had taken place during life.

60. When instead of presenting itself in the latter periods in the form of a homogeneous pus, the sputa have continued to appear separate, and to float on a copious serum, it is common to see them suddenly change their character forty-eight or twenty-four hours before death. The most liquid part disappears, and the

sputa form at the bottom of the vessel a flattened mass, of a dirty grey colour, not detaching itself from the vessel when inverted.

61. At other times, a little before death, every species of expectoration is suppressed, and if at the same time the other symptoms become aggravated, if — above all, the strength diminish suddenly — this suppression must be considered as the worst omen.

The suppression of the expectoration may here, as in pneumonia, depend on two causes. Most frequently the patient, having arrived at the last stage of marasmus and debility, has no longer strength to expectorate. The liquid accumulates in the larynx, trachea, and bronchi, and the patient dies in a state of asphyxia. At other times the patient ceases suddenly to expectorate, without any rale being heard in the trachea. At the same time the gurgling ceases all at once to be heard, where some hours previously the ear detected it in the most evident manner. In this case, it must necessarily be admitted that the liquid which filled the cavity has been re-absorbed. Thus sub-cutaneous purulent collections, appreciable both to sight and touch, sometimes disappear in a very short space of time. We have met vast cavities entirely empty in several phthisical persons, whose expectoration was thus suppressed a little time before death.

62. We have still to notice some more or less rare particulars which the sputa of phthisical patients present in their composition.

It is a vulgar opinion that portions of the lungs are found in the expectoration of phthisical patients; this case is much rarer than persons unconnected with the medical profession think; it is, however, a real case. Let us call to mind first, that we have sometimes found in the midst of a tuberculous excavation, real fragments of pulmonary substance, which had been probably detached from some bands which traversed the cavern; such a separation may take place without hemorrhage, in consequence of obliteration of the vessels. More frequently we meet these same bands which no longer hold to the rest of the pulmonary parenchyma but by a very thin pedicle, which is broken by the slightest handling. Besides, we have also seen other diseased organs, in a state of degenerescence, broken and detached as here by large fragments, which were then expelled when there was an open communication. Thus in recently opening the body of a woman who died of cancer of the uterus, we found in the cavity of its neck, which was very much dilated, a considerable portion of encephaloid tissue, which was detached in one single mass from the cancerous parietes of the organ.

These facts being known, it may be conceived that a fragment of pulmonary parenchyma, once free in a cavern, may make its exit from it through an opening of a bronchus, and finally be expectorated.

What we have just said of the parenchyma of the lung, we shall also say of the different parts which constitute the parietes of the bronchi; the latter, when struck with inflammation, may become so far disorganised that the cartilages, at first exposed by the destruction of the mucous membrane, may themselves become detached in fragments more or less extensive, which, having become free in the cavity of the brochus, shall then be easily expelled by expectoration. We shall return to this subject at a future period.

63. In the midst of the ordinary expectoration of phthisical patients, we have sometimes met species of membranous concretions, similar to those of croup. We must not confound these debris of false membranes with portions of hydatids, which may also be given up by expectoration, of which we shall presently cite some instances. Usually these false membranes appear in the sputa only at long intervals. Only once have we seen them, in much larger quantity, become every second or third day mixed with the sputa for more than a month. The patient presented all the symptoms of pulmonary phthisis already in a very far advanced stage; a gurgling, which was very

loud, and circumscribed between the right clavicle and breast of the same side, indicated at this point the existence of an immense cavity. The cough, which was frequent, returned in very painful fits: voice completely gone. Two or three days did not pass without the patient expectorating with more or less effort some membranous shreds of an irregular form and white colour, without trace of organisation: some exertion was necessary in order to tear them. The largest expectorated were more long than broad; they were about three inches in the former diameter, and one in the second; one of them was a little rolled on itself. Others were so small as not to be six lines in diameter in every direction. This patient, who, in all probability, had but a little time to live, wished to leave the hospital, and we lost sight of him. It would have been curious to verify in what part of the air tubes the numerous false membranes which he had expectorated were formed: was it in the larynx itself, as his voice, which was extinct, might have made us suspect? and was this individual affected with a sort of chronic croup? Did this formation rather take place, either in the trachea, or in different bronchial ramifications? Lastly, might it not even be admitted that the debris of false membranes expectorated came from the interior of the caverns? We know that the parietes of the latter are most frequently lined by a whitish membranous layer: is it not this which was detached in fragments and became mixed with the matter of expectoration? These different suppositions are all more or less admissible; besides, there have been already cited several examples of chronic bronchitis existing in children, or in adults, and accompanied by an expectoration of false membranes which, under some circumstances, retained the form of the bronchial branches whose parietes they lined. These facts prove, among other things, that the formation of false membranes on the surface of inflamed mucous membranes, depends not solely on the intensity of the inflammation; here, in fact, they are produced in abundance under the influence of a simple chronic inflammation.

64. Calculous concretions are sometimes expectorated during the course of phthisis: our own observations incline us to admit that it is most frequently in persons affected with pulmonary tubercles that this expectoration takes place. It may show itself at different periods of their disease. We have the case of a young person (a young Greek) who expectorated small calculi, at the same time that the first symptoms of phthisis showed themselves in him; but this seems to us the most uncommon case; and it is ordinarily only at a more advanced period of pulmonary consumption that patients sometimes expectorate calculous concretions. We have seen, for instance, a girl eighteen years of age, who had arrived at the last stage of marasmus, with immense cavities in the lungs, expectorate, only two days before her death, a calculus with an irregular surface, and the size of a small kidney-bean. The expectoration of this calculus was neither preceded nor followed by any unusual phenomenon.

All the individuals in whose expectoration we observed calculi, were young persons; so that, in this respect, our observation is not in accordance with that of the authors who consider this kind of expectoration as most common in old persons.

The size of the pulmonary calculi is very variable: some have been observed which scarcely equalled the size of a grain of millet; others, still rarer, were of the size of an ordinary kidney-bean. We read in the acts of the Academy of Copenhagen, the history of a woman, who, in a violent fit of coughing, threw up a stone as large as the first phalanx of the thumb. Morgagni states he saw a pulmonary calculus as large as the stone of a peach; it had been expectorated in the midst of a very severe fit of coughing (*conatu immani*). The patient declared that he very distinctly felt it ascend from the right lung into the trachea. Shenkius speaks of a young woman, fourteen years old, who expectorated a calculus as large as a nut.

The number of stony concretions expectorated are in the inverse ratio of

their size. We meet in the *Dictionnaire des Sciences Médicales* (Article, Cas rares), the case of a phthisical patient who, for the last eight months of his life, expectorated upwards of two hundred small stones. A young woman, whose case is given in one of the numbers of the *Bibliothèque Médicale* for 1820, expectorated in three months twenty-two pulmonary concretions, the largest of which was the size of a cherry. M. Portal speaks of a person who expectorated more than five hundred calculi; the first discharged were not larger than a grain of millet; he then gave up others as large as a pea.

The form of the pulmonary calculi, their colour, and other physical properties are no less variable. Sometimes they are small, gritty, friable masses, resembling plaster saturated with moisture, readily crumbling under pressure of the finger; sometimes they have much greater hardness; a certain degree of force must be used to break them. Sometimes they resemble grains of sand, or, as some say, portions of the hardest flint (we have never seen any of this latter species). They may be oval, cylindrical, globular, pyriform. They are often observed to be marked on their surface with numerous asperities, thus bearing some resemblance in their form to the mulberry calculi of the bladder. Most of these concretions are of a greyish white colour. We once saw some which were dotted as it were with a number of small black points.

Almost all the pulmonary calculi hitherto submitted to chemical analysis, have been found to consist of phosphate of lime, combined with a little animal matter. It is only in some very rare cases that the existence of carbonate of lime has been detected.

What is the origin of the expectorated calculi? what is their seat in the lung? There are cases where the answer to this question is easy. Several of these calculi appeared to be produced in the bronchial ramifications, as is attested by their branching form, resembling that of several renal calculi, which occupy at once the pelvis and several calices; we may conceive also that it must be in the mucus of the bronchi as of the other liquids of the living body, in most of which calculi are seen to become developed. One may suppose such to be the origin of these numerous concretions, which have been sometimes expectorated during a longer or shorter space of time without any perceptible derangement of the health, before, during, or after their expulsion. Aretæus had already remarked that several persons whose sputa contain small calculi, experience no alarming consequence from them. Olaüs Borrichius has cited the case of one of his friends, who for twelve years used to expectorate from time to time small stones, after a fit of coughing, without his health being injured thereby. Such was also the case of the individual whose case has been already cited from M. Portal.

Several other calculi, though also having their seat in the bronchi, may nevertheless have a different origin from the preceding. From a fact to be presently mentioned, we are inclined to suspect, that some of the calculi thrown up by expectoration are nothing else but ossified bronchial cartilages. The following is the fact on which we found this conjecture: —

A man, about forty-years of age, died of phthisis in the La Charité; he had had frequent attacks of hemoptysis, and in the midst of one of them he died. On opening the bronchi in their different ramifications, we were struck with the size and consistence which the thick cartilaginous points had acquired, which in the normal state traverse the parietes of the small bronchi. Several of these points had acquired real bony consistence. Two of them were no longer covered by the ulcerated mucous membrane, and they were so moveable that, by drawing them gently with a forceps, they were readily brought into the cavity of the bronchus. It is not unreasonable to admit that such a separation might have been effected spontaneously during life, and thence the small ossified cartilage was changed into a calculous concretion, of which the patient should free him-

self by expectoration. It is thus that there have been sometimes found, floating freely in the cavity of an artery, osseous concretions detached from its parietes. It is thus also we may explain the formation of those bony or cartilaginous concretions found perfectly free on every side in certain joints. Not long since, on opening the body of a woman, we met a rounded concretion, about the size of a pea, which, with respect to its origin, may be assimilated to the preceding; it was entirely free in the cavity of the peritoneum, where it was seen to float in the vicinity of one of the ovaries.

Under other circumstances, the expectorated calculi may come directly from a tuberculous excavation where they were produced. Twice, in fact, we have found, in the midst of large caverns filled with purulent liquid, a hard calculous concretion, of the size of a hazel-nut, the surface of which was marked with numerous asperities. These caverns communicated with the bronchi by large openings, and it is probable that if the patients had lived a longer time, these calculi would have been rejected by means of expectoration.

Finally, there are some calculi, and these are not the least numerous, which seem to be produced in the midst of the parenchyma itself, in which they are as it were implanted. However, if regard be had to the ramifying form of these calculi, if we compare their figure with that of the culs-de-sac which terminate the bronchi, such as they are represented in Reissessen's work, we shall be inclined to think that here again the concretion has its seat in the ultimate extremities of the bronchial tree, in the air-vesicles.

There is another remarkable fact with respect to these calculi, which appear to be thus produced in the midst of the pulmonary parenchyma — it is that they are almost always mixed with tuberculous masses. Attentive observation leads one even to admit that many calculous concretions were at first but tubercles, which gradually became hardened by reason of a change in their chemical composition. In fact, in a lung where there are found several calculi placed in the centre or in the vicinity of tuberculous matter, we see in other points this same matter beginning to lay aside the characters of ordinary tubercle; it resembles plaster very well softened in water, with which it is saturated; but it seems that the molecules constituting the tubercle which has passed into this state have lost their cohesive power; they are separated from each other, and resemble small grains disunited by a more liquid substance. Analysis demonstrates in this variety of tubercles a little phosphate of lime combined with a great quantity of water and animal matter. By length of drying the water is evaporated, the molecules approximate more and more, and this mass, still half liquid, ultimately acquires a stony consistence. Numerous trials have satisfied me of the correctness of these facts. What takes place before our eyes under the influence of mere physical evaporation, seems also to take place in the lung under the influence of a process of absorption, which carries away from the tubercle its most liquid part, at the same time that a more considerable quantity of phosphate of lime is secreted. It is certain at least that this successive change of the tubercle into a calculus may be very easily traced in some lungs. It may thence be conceived how the expectoration of calculous concretions is so often accompanied by the symptoms of pulmonary phthisis.

This change of the tuberculous matter into calculous seems capable of taking place even in cases where there has been softening of a greater or less mass of tubercles, which, having been discharged through the bronchi, has left in its place a greater or less excavation. We have a case which warrants us in this statement.

From the different observations just made it follows —

1st. That the expectoration of a greater or less number of calculi is frequently, though not constantly, united with the existence of pulmonary tubercles.

2dly. That the serious symptoms which precede, accompany, or follow the expectoration of these calculi, depend much less on the presence of the latter in the pulmonary parenchyma, than on the simultaneous existence of tubercles. We know of but very few cases where symptoms of phthisis have become manifest consecutively to the existence of simple calculi in the lungs. Bayle has cited but one single instance in the thirty-third case of his work, and yet it might be objected to him that the *cretaceous moist matter* surrounding the calculi scattered through the pulmonary parenchyma had been at first real tuberculous matter; this consequence, which Bayle did not draw, might result from the facts already cited by us. The calculous phthisis of Bayle is then a disease at least very uncommon: we admit the possibility of it, though we know not of any positive facts to demonstrate its existence.

3dly. A certain number of calculous concretions may have their origin in the different ramifications of the bronchial tree. After death this origin may be demonstrated by anatomical inspection. During life, it may be admitted, if, before or after the expectoration of the calculi, no symptom of pulmonary phthisis is remarked.

4thly. Finally, in all the cases of calculous expectoration, the prognosis should vary according to the constitution of the subject, previous circumstances, and the nature of the phenomena which manifest themselves during and after the expulsion of the calculi.

65. The sputa of phthisical patients, studied with respect to their odour, most frequently present nothing remarkable in the different periods of their disease; whether they come from the bronchi or from cavities, they exhale, in the greater number of cases, but a dull odour, not very disagreeable. This absence of odour in the sputa often continues till death; in other physical patients the expectoration becomes very fetid during the last few days before death; in others, but certainly they constitute the smaller number, the expectoration is more or less fetid during the entire course of the disease.

Does the fetid odour presented by the expectoration in certain phthisical patients depend on the presence of air in the caverns? It cannot be admitted. Often, in fact, have we blown a great quantity of air through large bronchial tubes, and yet the sputa were never fetid: the matter contained in the caverns was also inodorous. At other times, the existence of a well-marked gurgling during life admitted not of a doubt that the air entered freely into vast caverns full of liquid, and still the matter of expectoration was inodorous. Thus, then, the fetor which it presents in a certain number of cases seems to depend principally on its own nature, and on the modification which the secretion undergoes, from which also result all the other varieties of the sputa. In many other secretions we see certain odorous principles thus produced without our being able to ascertain with what modification of the secreting organ their production is connected. Thus, for example, in two individuals apparently placed in the same conditions, the perspiration of the one is inodorous, whilst that of the other emits a strong very disagreeable odour.

In several persons whose sputa had a very fetid odour, we not only did not find in the lungs any particular lesion to account for it, but there was not even yet a cavern; some crude tubercles merely traversed the pulmonary parenchyma; in others, in fine, there were not even tubercles, and the only affection was chronic bronchitis.

But in a certain number of patients we have seen the fetid odour of the sputa coincide with the existence of a more or less extensive gangrene, which attacked even the parietes of one or more tuberculous excavations. This gangrene may be recognised — 1st. By the odour which the affected parts exhale; 2dly, by the greenish, or ash-grey colour of these same parts; 3dly, by their softening in some cases, and their change into a grey or black detritus. It is a remark-

able thing sometimes to observe this gangrene limited to the extent of some lines around tuberculous excavations; between the latter the pulmonary parenchyma no longer presents any trace of it. It is one of the causes which may hasten death in a certain number of phthisical patients; the moment of its supervention is announced by the fetid odour which the sputa assume, and subsequently by their change of colour, if the patient live long enough for the gangrenous part to break down, and constitute a part of the matter of expectoration. Thus the edges and lower parts of certain cancerous ulcers of the stomach, and particularly of the uterus, often become gangrenous. More frequently still than in man, we have ascertained in animals, and particularly in the horse and the hog, the existence in the lungs of a gangrene limited to the parietes of tuberculous excavations. It is probable, besides, that the gangrene, in this case, is but consecutive of an attack of chronic inflammation, of which the pulmonary parenchyma had been the seat around the caverns. The latter may then be compared to certain ill-conditioned ulcers around which the inflammatory process is so modified as to have a remarkable tendency to gangrene.

We have seen individuals who appeared to be affected only with a simple chronic bronchitis, and in whom the expectoration, habitually inodorous, assumed at intervals a real gangrenous fetor, without the other qualities of the sputa, and particularly their colour, undergoing at the same time any change. One can scarcely admit that in such cases this fetor, great and repulsive as it was, indicated a gangrenous state of the lung. How conceive, in fact, that without producing a group of very serious symptoms, could the gangrene thus attack the pulmonary parenchyma at different times? In the next place, in order that the sputa might cease to be fetid, if their fetidity was caused by gangrene, the gangrened parts of the lung should have been detached and expectorated in the form of a greyish detritus, which cannot well be mistaken, or overlooked. (Here the author details a case of fetid sputa considerable enough to induce one to believe in the existence of gangrene of the lung which disappeared spontaneously after a certain time.)

Whatever be the cause to which fetor of the sputa in the above case may be attributed, it will be retained as rather a curious practical fact that the gangrenous-like fetor of the sputa may disappear after having lasted for a longer or shorter time, and consequently that it is not a sign necessarily fatal.

66. The taste of the sputa of phthisical patients has been noticed as carefully as their odour. Most authors have stated that phthisical patients, whose sputa are insipid, are less inclined to fall rapidly into marasmus.* Our own observations have not confirmed the truth of this adage. We have seen some phthisical patients who complained of the insupportable taste of their sputa, and who wasted away but slowly. Others, on the contrary, whose sputa were almost insipid, sunk much more rapidly. We have seen but very few phthisical patients who told us that they found in their sputa the sweet and saccharine taste which Hippocrates considers as one of the signs of pulmonary consumption. According to most writers, these saccharine sputa are uniformly accompanied with rapid emaciation. But we think this opinion was principally advanced to support an old hypothesis, according to which it was admitted that the saccharine taste of the sputa was owing to the presence of the nutritive matter, which, passing through the diseased lungs, could not be elaborated there, transuded through the parietes of the bronchi, and became mixed with the sputa, of which it constituted a considerable part.

With respect to the salty sputa also noticed by Hippocrates,† and which

* *Ad phthisim proni, qui frequenter insipida sputant, tardius tabescunt.* (Bennet. Theatrum Tabidorum.)

† *Phthisici salsuginosum spuunt, deinde dulcius.*

Morton considered as a precursory sign of phthisis, we think that too much importance has been attached to them. We have seen several individuals affected with simple bronchitis, whose sputa had a saline taste, and who did not become phthisical. On the other hand, we have met as great a number of phthisical patients whose sputa never presented any well-marked saline taste.

67. The kind of intermission presented by the expectoration in a certain number of phthisical patients is an important circumstance to be known. In individuals, for example, whose lungs contain numerous caverns, we see for several successive days the matter of the expectoration constituted merely of a little greyish and thready mucosity; then the sputa, suddenly changing character, became purulent and similar to the matter contained in caverns; after this expectoration has continued a longer or shorter time, it ceases anew, in order to be replaced by a simple expectoration of mucosity, and so on for several successive times. In several phthisical patients the expectoration is characteristic only during the night or the morning; the rest of the day they do not spit, or their expectoration has quite a different appearance. In others, the expectoration takes place only towards the end of the exacerbations of the hectic fever; their cough is dry during the entire paroxysm. It is the same, in this respect, with the tuberculous excavations of the lung as with several external ulcers, whose surface has been seen to become dry during the accession of an intermittent fever, and commence to become moist again according as the accession approached its termination.

68. After having sketched the principal features of the history of the expectoration in phthisical patients, it remains for us to inquire how far the consideration of the sputa, in these patients, may lead to certain data concerning the existence of pulmonary tubercles. Observation has convinced us, that there are scarcely any of the shades of the sputa of which we have spoken, which are not also observed in cases of simple chronic bronchitis. According to the infinite varietes of inflammation, which may affect the air passages, the liquid secreted by the mucous membrane may present most of the shades with respect to form, consistence, colour, and odour, which is presented by the liquid formed in tuberculous excavations.

On the other hand, in more than one case of phthisis with softening of tubercles and formation of caverns, the expectoration is seen to remain constantly mucous, such, for instance, as is observed towards the middle or end of certain cases of acute bronchitis; and it is evident that in cases of this kind the consideration of the sputa can only lead into error with respect to the real nature of the disease.*

69. From the different observations now made, it appears to follow that the mere examination of the sputa should not suffice to affirm any more than to deny the existence of pulmonary phthisis. Thus, when Cullen defined this disease, an expectoration of pus or of purulent matter which comes from the lungs and is accompanied with hectic fever, he gave a definition which to me appears incomplete and inaccurate, since it is based on a symptom which does not always exist, and which, when it exists, does not suffice to characterise the disease.

SECTION VI.

SIGNS AFFORDED BY HEMOPTYSIS.

70. Observation has a long time back demonstrated the very frequent con-

* The author here mentions three cases, in the first of which the expectoration was purely catarrhal all through; in the second it was characteristic only at intervals, and in the third there existed a cavity without cough or expectoration. — Trans.

nexion of hemoptysis with the present or future existence of pulmonary tubercles; wherefore it appears unnecessary for us here to adduce new facts in support of a truth so generally recognised.

It is on other points of the history of hemoptysis that we must principally dwell in this paragraph. We shall endeavour to determine what are the different lesions of the lung, coinciding or not with tubercles, which may be considered as the cause of spitting of blood. We shall then seek to appreciate the different circumstances in which hemoptysis manifests itself in the different stages of pulmonary phthisis: finally, we shall mark the cases where profuse hemoptysis has existed without having been followed by the symptoms of phthisis.

71. Our observation inclines us to admit four principal sources for the blood which is expectorated. It may come, first, from the mucous membrane of the bronchi; secondly, from the parenchyma of the lung; thirdly, from a tuberculous excavation; fourthly, from an aneurism of the aorta. Here we shall speak only of the first three cases.

A. Blood exhaled by the mucous membrane of the air-passages (bronchial hemorrhage).

In a certain number of individuals who have died during profuse hemoptysis, we have not been able to assign any other source to the expectorated blood but the mucous membrane; there were also observed at the same time tubercles in different stages of development. On one occasion only we found none; the pulmonary parenchyma was perfectly healthy, and the exhalation of blood which took place on the surface of the bronchi seemed to be the sole cause of death. Thus we have seen individuals hurried to the grave by profuse intestinal hemorrhage, and more than once epistaxis has compromised the life of the patient. The mucous membrane, the source of the hemoptysis, presents no other lesion in this case but that which it exhibits in cases of simple bronchitis. Sometimes even it is then pale, or presents at most a rosy whitish tint. This again is what we see for hemorrhages of other mucous membranes. In several cases of intestinal hemorrhage, in particular, we have found the mucous membrane generally pale, with slight injection in some points. One may, no doubt, attribute this want of colour of the mucous membranes after hemorrhage to the circumstance of the blood having escaped from the vessels, instead of remaining in them. In whatever manner we may explain the fact, it is not the less important to retain it.

B. Blood furnished by a sanguineous effusion which took place in the midst of the pulmonary parenchyma. (*Pulmonary apoplexy of Laennec*, pulmonary hemorrhage.)

Ever since pulmonary apoplexy, which we prefer to call pulmonary hemorrhage, in opposition to bronchial hemorrhage, was noticed and so well described by Laennec, we have had frequent opportunities of observing it. Where does the sanguineous effusion exist? Some researches incline us to think that it probably takes place chiefly in the ultimate ramifications of the bronchial tree, in the pulmonary vesicles themselves, and consequently that pulmonary hemorrhage might be to bronchial hemorrhage what pneumonia is to simple bronchitis, different degrees of one and the same affection. (On this last point see preceding part of this volume.) If, in fact, we submit the black and hard masses of pulmonary apoplexy to a little maceration, we perceive them become white, and according as the water carries away the blood accumulated in these masses, the latter, when cut in slices, present on their surface a great number of small lacunæ, which make them appear as if pierced with holes. Now whence can such an appearance arise, unless from bronchial branches which were considerably dilated by the coagulated blood which filled them? A repetition of these investigations we recommend to anatomists.

If these apoplectic round masses are solely the result of an effusion of blood, why do they most commonly present a deep black colour? That does not probably arise from this circumstance, that the blood which is effused is always venous blood, but rather from the stagnation of this blood, whether arterial or venous, in the midst of the tissues. Some old experiments of Hunter's, often repeated since his time, have proved that when the blood is arrested in a living animal between two ligatures, that contained in an artery soon presents the dark colour of venous blood. Thus, in the brain, as in the lung, the blood which has been effused for some time, presents a much blacker colour than that of venous blood itself.

Whence, then, arises the extreme hardness of these same masses? Their cause may be attributed to the absorption of the more liquid part of the effused blood, and to the rapid coagulation of that which remains. This is also observed in certain cases of cerebral apoplexy. If we were permitted to be present at the formation of pulmonary apoplexy, it is probable that there would be a period when the portion of lung which is the seat of it would not present to us the remarkable hardness which it presents at a subsequent period. This conjecture seems to find support in the following fact: —

A man, forty-five years of age, affected with aneurism of the thoracic aorta, died in the La Charité, in the month of October, 1824. Towards the centre of the left lung, a portion of the parenchyma, the size of a lemon, presented a redder colour than the remainder of the organ. Far from being hardened, this portion was, on the contrary, remarkably soft; a great quantity of blood flowed from it, which seemed to be, as it were, effused into it; one would have pronounced it to be a sort of apoplectic clot. Is not that a state which may precede the formation of the hard and black round masses described by Laennec?

The exaggeration, in some measure, of this same state is found in the following case related by Corvisart. (*Commentaires sur le Traité de la Percussion d'Avenbrugger.*) A man, thirty-seven years of age, went to bed in very good health at eleven o'clock at night; when, at half-past three in the morning, they wished to awaken him, he was found dead. Some blood escaped through the nose and mouth. The entire of the right lung was found to be lacerated, and as it were macerated in an enormous quantity of black blood with which it was engorged. The substance of the lung seemed to be really confounded with the clots. The bronchi were full of black blood, as well as the trachea, larynx, fauces, and nasal fossæ. There was also a reflux of blood into the bronchi of the left lung. No other lesion existed.

Pulmonary hemorrhage does not necessarily induce hemoptysis. More than once we have found apoplectic-like engorgements in the lungs of individuals who had never spit blood. In others, the blood which was first effused into the lung makes its way into the cavity of the pleura. Here is a case of this kind.

Case 8.—Sanguineous effusion primarily formed in the parenchyma of the lung and opening into the pleura—Pulmonary tubercles.

A man, of middle age, presented the different symptoms which characterise pulmonary phthisis already very far advanced; gurgling and dull sound without manifest pectoriloquy below the two clavicles; frequent cough, with expectoration of puriform sputa (nummular patches separated from each other, floating on a gummy-like liquid); previous attacks of hemoptysis; but little dyspnœa; night sweats; diarrhœa without pain; marasmus.

One morning we found the patient breathing with much more difficulty than

usual: he lay on the left side, and could not assume any other position without his breathing becoming much more embarrassed. He had felt no pain in the chest; the sputa were slightly tinged with blood; posteriorly on the left, and laterally, as far as a little above the level of the inferior angle of the scapula, the sound was very dull; the respiratory murmur was absent, except when the patient exerted himself to take a deep inspiration; then the bronchial respiration was heard. Over this same extent the voice presented a resonance which it had not elsewhere. The two following days the dyspnœa became still greater; the sputa were coloured with a greater quantity of blood, and the patient died.

Post-mortem. Numerous tubercles in the lungs; large excavations at their summit, with grey or black induration around them. The upper lobe of the left lung was closely adherent to the ribs; but between the thoracic parietes and the lower lobe of the same lung, a considerable quantity of reddish serum was interposed with deposition of membranous flocculi on the free surface of the pleuræ costalis and pulmonalis.

So far no lesions were found but such as were foreseen; but further, after the liquid contained in the left pleura had been extracted from it, it was seen that at a point of its periphery the pulmonary parenchyma was really torn to an extent equal in breadth to that of a two-franc piece. On making an incision at this point, it was found that over a space which might have been occupied by a large-sized orange, the tissue of the lung no longer existed except in the form of debris, if I may say so, to which a black blood, still liquid in some points, and coagulated in others, was intimately united, as if it were combined. Nothing remarkable in the remainder of the respiratory apparatus. A great quantity of reddish liquid in different points of the intestines, which were in other parts ulcerated.

Here again, pulmonary apoplexy existed with softening and destruction of the parenchyma, into which the lung was effused: this destruction had gone so far, that the tissue of the lung was torn in a point of its periphery; thence, effusion into the pleura of a greater or less quantity of blood; thence, in fine, the pleuritis by which the death of the patient was accelerated. It is remarkable that in this case the commencement of this inflammation was not marked by any pain, though the inflammation had been acute, and produced by the introduction of a foreign body into the pleura.

We shall also notice, though the matter is foreign to the present subject, the coincidence in this case between the pulmonary hemorrhage and the intestinal sanguineous exhalation. To this fact we shall add two others, which also relate to pulmonary apoplexy: the first will present us an example of this apoplexy with hemoptysis; and the second, a case of this same affection without spitting of blood.

Case 9.—Pulmonary apoplexy with hemoptysis.

A young girl, twenty-one years of age, felt for nearly the last year violent palpitations of the heart. Her breathing was habitually short; she was put out of breath by the least exertion; she coughed and expectorated for the last six months; the lower extremities were infiltrated; her strength went on diminishing. On the 10th of November, she, for the first time, spat up a considerable quantity of red blood. The hemoptysis ceased on the 11th. On the 12th, it reappeared in greater quantity: it was accompanied with orthopnœa and syncope, which lasted a considerable time. On the 13th, there was continuation of the hemoptysis; the patient then entered the La Charité, and presented the following state: —

All the skin was very pale, except the cheeks, which were red. Infiltration of the extremities; emaciation of the trunk; puffiness of the face; lips tume-

fied and violet-coloured: she constantly sits up, saying that she feels suffocated when she lies down. Breathing short, high, and frequent; coughing fits, followed by a profuse expectoration of sputa, which consisted of pure frothy blood. The chest, when percussed, yielded a sound which was in general obscure, which circumstance might be attributed to the slight infiltration of the integuments; a well-marked mucous rale, probably the result of the mixture of blood and air in the bronchi, was heard in different parts of the chest, especially anteriorly, between the clavicle and breast of the right side, and posteriorly between the scapula and vertebral column. The pulsations of the heart, irregular and frequent, were heard under both clavicles; pulse hard and frequent. (Leeches to the anus; sinapisms to the feet.) A great quantity of blood was expectorated during the day. In the night the oppression became extreme, and the patient died, expectorating with great efforts a great quantity of blood, which she seemed to vomit.

Post-mortem. On the surface of the right lung, which adhered slightly to the ribs, there were found four brownish spots, being, on an average, the breadth of a three-franc piece. In the place where these spots were found, the tissue of the lung was very hard, black, and granular when cut into; a liquid similar to coagulated venous blood issued from them by strong pressure. A similar appearance extended from four to five inches into the interior of the viscus. Around this alteration the tissue of the lung was pale, crepitous, and engorged with serosity. A second similar alteration existed towards the summit of the same lung; there were also observed there two small black clots lodged in the middle of the parenchyma, which they compressed around them. Lastly, in the centre of the organ, two other small tumours of a similar nature, which were also circumscribed by a pale and crepitous tissue; they were both nearly the size of a filbert; that in the summit of the lung was as large as an apple. The left lung, which in general was healthy and crepitous, also contained in its summit two engorgements similar to the preceding, the size of a large nut, and so hard that the finger could scarcely enter them by strong pressure. A very healthy pulmonary tissue limited them exactly. Towards the base, along the anterior edge, there was found another engorgement as large as a nut; it was less hard than the others, of a less deep brown colour, and marked in its centre with a violet-coloured spot. The bronchi of the two lungs, of a light rose colour, were filled with a red frothy liquid. Near the engorged nuclei we found several bronchial ramifications distended with clots of black blood.

The great number and size of the apoplectic engorgements seated in the two lungs were here proportioned to the profuseness of the hemoptysis which had taken place. It was probably from the entire surface of the bronchial mucous membrane that the expectorated blood came; perhaps the black and hard portions of the pulmonary parenchyma indicated only those of the bronchial branches where the blood was more particularly accumulated. Let us call to mind, in fact, the black clots which, near the apoplectic-like nuclei, distended a certain number of bronchial ramifications; let us suppose all the branches of one lobule equally distended by these same clots, the result will be a uniform black colouring, in the midst of which we shall no longer be able to distinguish any of these branches. If they be too forcibly distended by the blood which fills them, their parietes may give way, and the result will be the presence of a mass of liquid or coagulated blood in the midst of the pulmonary parenchyma, where it will be then really effused. This is what we have seen to happen, both in this case, and particularly in the preceding cases, where the blood having escaped from these vessels had softened and destroyed the lung, as it softens and destroys the portion of the brain where it is effused. We are aware, also, that what we here consider as an effect, may also sometimes precede and cause the sanguineous effusion.

We shall now cite a case in which there also was pulmonary apoplexy, but without spitting of blood.

Case 10. — A woman, seventy-two years old, was sunk in an adynamic state when she entered the La Charité, towards the beginning of the month of May. The cause of this state was found to be a gastritis, which was announced by a brown redness of the tongue, by its dryness, and by vomitings. The patient said that she had laboured under a catarrh of long standing. The breathing was embarrassed; the chest in general very sonorous; the respiratory murmur very weak, which seemed to disagree both with the hurried state of the breathing, and with the great sonorousness of the thoracic parietes. This woman continued to become weaker, and died on the 18th of May. The autopsy disclosed numerous lesions in the organs of digestion and circulation. The lungs presented the following state: — When removed from the thoracic cavity, they did not collapse; their vesicles presented manifest general dilatation. The summit of the left lung, which was a little puckered externally, was hard, black, and contained a cretaceous tubercle smaller than a nut. No other tubercle was found in the remainder of the lungs. The parietes of a great number of bronchi were perceptibly hypertrophied. Their inner surface presented beneath the mucous membrane two planes of fibres much more distinct than usual; those of one, longitudinal and parallel to each other, seemed to be of a fibrous nature; the others, more deep-seated, and visible without any laceration in the intervals between the preceding, were transverse, and presented a muscular appearance.* Beneath these two planes was a great number of cartilaginous grains, several of which had passed into the osseous state. Still more, in a point of the periphery of the right lung, there appeared a spot of a deep black colour, the breadth of a five-franc piece. Through the entire of this spot the pulmonary tissue was very hard: it presented, in a word, for the space of three or four inches below the spot, and for near an equal breadth, all the characters of apoplectic engorgement, such as was described in the preceding case.

Besides the existence of this pulmonary apoplexy without hemoptysis, the preceding case presents to our notice: 1st, the general dilatation of the pulmonary vesicles; 2dly, the modifications which the parietes of the bronchi underwent in their nutrition, consecutively to the old catarrh of which the patient complained; 3dly, the existence of a single tubercle, of a cretaceous nature, in a woman seventy-two years old; 4thly, chronic inflammation, with puckering of the portion of the parenchyma surrounding this tubercle, an inflammation not affecting any other point of the lung.

C. Blood coming from a tuberculous excavation.

In a certain number of phthisical patients who died spitting blood, we have found one or more large cavities formed in the lungs filled with this liquid. Sometimes this blood was in the liquid state; sometimes it was found partly coagulated. We remember, among other cases of this kind, that of a young woman, who entered the La Charité in the month of March, and who presented all the symptoms of pulmonary phthisis in a very far advanced stage. Nothing, however, indicated as yet her approaching dissolution, when all at once she began to spit blood in such large quantities, and with such efforts, that she seemed to vomit it. She soon died asphyxiated. An immense cavern was found in each lung filled with large clots of blood; the bronchi and trachea were full of frothy blood. Such a case is rather rare; but what is infinitely more common, is to

* The muscular fibres of the bronchi appeared to us very evident in the horse, where those more marked are circular, as those whose existence in man seems here to be proved by a pathological case.

find the tuberculous or purulent matter contained in the cavities of a more or less red colour. This tint depends, in all appearance, on the presence of a greater or less quantity of blood; the sputa then present the reddish colour already mentioned.

We have been but once able to find the orifice of the ruptured vessel from which the blood had probably escaped in order to fill the cavity. This vessel was contained in a band which traversed the cavity, and was torn. Its orifice was closed by a small fibrinous clot of a white colour, which was easily extracted from the vessel. We were then able to satisfy ourselves that the cavity of the latter was still retained. But in all the other cases, it was always impossible to refer the existence of the hemorrhage to the rupture of any large vessel. Was this hemorrhage then the result of a sort of exhalation which took place on the surface of the parietes of the cavity? These facts do but confirm the facts already known regarding the prompt and complete obliteration of the large vessels which traverse tuberculous excavations. Most frequently these vessels are found almost in the same state in which the umbilical artery presents itself in the adult. The complete obliteration of the vessel seems to be preceded by a very considerable thickening of its parietes; sometimes then a very fine stylet may be introduced into its interior, and, if it be cut through, there is seen in the midst of a sort of fibrous cord a very small capillary orifice; the latter disappears in its turn, and the vessel is then changed into a perfectly full cylinder. We cannot do better than refer to the excellent observations published by Laennec on this interesting point of pathological anatomy, which had been already vaguely noticed by Baillie and Stark.

72. The hemoptysis, the principal sources of which we have been now considering, is far from being always followed, preceded, or accompanied by the symptoms of pulmonary phthisis.

However, observation does not suffer us to deny that in the greater number of cases hemoptysis is connected with the existence of tubercles in the lungs. We have met with but a very small number of individuals, who, after having spit blood in considerable quantity, did not become phthisical. Here are some facts of this kind: —

A lady, now sixty-one years old, was attacked at the age of fifty-four with a very severe pulmonary catarrh, which was not, however, accompanied with fever, and which neither prevented her from going out or attending to her usual occupations. Before this cold she never had a serious cough, nor any difficulty of breathing. In the midst of the cold, and, in spite of our remonstrances, she spent several hours, during Lent, in a cold damp church; in this church she was attacked by a profuse hemoptysis, which continued for the six following days; every day she spit up a glass of bright red blood as if in vomiting; during all this time the pulse continued frequent and full. A large quantity of blood was taken from her; she kept her bed, and observed strict silence and regimen. During twelve days a little blood still continued to tinge the sputa; the cough continued for about a month and then ceased, and since this time, that is eight years, she has never had a cold; her breathing has remained perfectly free; she is in possession of all her strength, and nothing has been discovered either by auscultation, or by the aggregate of the symptoms, which could cause us to suspect the least lesion in the respiratory apparatus.

M——, now seventy-nine years of age, had a profuse hemoptysis at the age of twenty-one, with which he was attacked during the course of a pulmonary catarrh, which lasted several months. He continued an invalid for a year; since that period he has never had any affection of the chest.

In this same case is another man who is now sixty-four years of age, and who, at the age of thirty-five, spit a great quantity of blood; at this time he was looked on as one destined to die of phthisis. However, he perfectly re-

covered, his constitution became very strong, and up to this moment there is no sign nor symptom of any lesion whatever of the lung. But what is remarkable, out of five of his sons two have died phthisical.

In the different cases now mentioned, the individuals spit blood, in greater or less quantity, not more than once. We know another individual who is at present eighty-four years of age, and who, for more than fifty years, does not pass many months without spitting blood; in the interval between his attacks of hemoptysis he does not cough, and has no pain or any affection of the chest.

73. In these different cases it is not probable that the hemoptysis was connected with the existence of pulmonary tubercles; we have not, however, entire certainty of that; all that they prove is, that profuse spitting of blood may present itself without leaving any fatal trace after it for a length of years. Here now are other cases, in which, by *post-mortem* examination, we were enabled to arrive at the certainty that there were no tubercles in the lungs of individuals who had spit blood a longer or shorter time before their death.

We opened in the Maison Royale de Santé the body of an old man, seventy-one years of age, who had died of diseased liver. At the age of eighteen this man had spit a great quantity of blood for several months; for the remainder of his life he remained subject to catarrhal affections. We found no other lesions in the lungs than a perceptible dilatation of a certain number of bronchial branches. The heart was of the ordinary size, and presented the normal proportions. The liver was filled with cancerous masses.

A woman died in the La Pitié of cancer of the uterus, at the age of forty-seven: for the last fifteen years before her death this woman scarcely passed three months without spitting a certain quantity of blood. These attacks of hemoptysis came on her whilst engaged in her usual occupation as a washer-woman, and she was so little inconvenienced by them that she did not discontinue her usual mode of life. In the intervals of these attacks of spitting blood she was not subject to cough. On opening the body we found no appreciable lesion of the lung or heart.

To these examples we might add that of a young surgeon, M. Maréchal. He died of phlebitis, which came on after venesection. About four years before the disease of which he died, he had had a tedious and severe pulmonary catarrh, during which he spit much blood. We then attended him: his hemoptysis continued for at least fifteen days; it was attended with febrile disturbance and perspiration after sleep. It ceased, but the cough still continued for a considerable time, then it also disappeared, and his health was perfectly re-established, and continued good till the invasion of the disease of which he died. We reckoned that some tubercles might be found in his lungs; none were discovered, and the most careful examination detected no appreciable lesion in these organs; but the heart was very large.

74. Hemoptysis which is connected with the existence of tubercles shows itself more frequently during the first stage of phthisis. In a considerable number of patients it is in this way the disease commences. It is not uncommon to see persons whose health is perfectly re-established after a first hemoptysis, so that it does not appear to be connected with anything serious. At the end of a longer or shorter time a second hemoptysis supervenes, then a third, and again they are restored to health, finally, they have a new attack of spitting blood, and this time their health does not return; they cough, have oppressed breathing, and all the symptoms of pulmonary phthisis develope themselves. The following case presents a striking example of the little danger which certain attacks of hemoptysis may bring with them, even after they have been several times repeated.

Case 11.—Hemoptysis frequently repeated in a young man, without his health having been affected by it, or without any sign of pulmonary phthisis.

A young man, eighteen years of age, had had a first hemoptysis at the age of twelve. During the five following years he had enjoyed very good health, and had not been subject to catch cold. At the age of seventeen he again spit a considerable quantity of blood, and six months after he had a third hemoptysis; however, his health was not at all affected. At the age of eighteen he spit blood for the fourth time. It was then he entered the La Charité. This young man seemed to possess a very good constitution; he had considerable embonpoint, and his muscles were firm and well developed. He scarcely coughed at all, and felt no oppression. During the interval of the two last attacks of hemoptysis he had no catarrhal cold; he walked, ascended an eminence, and ran without feeling any dyspnœa. The chest when percussed sounded well in every part; the respiratory murmur, which was in general clear, was changed only by a little moist bronchial rale in some points. (Probably the result of the mixture of the air introduced into the bronchi with the blood which was exhaled there.) Neither had it that intensity, which almost always indicates the existence of an obstacle to the free passage of air or of blood through the lungs. The circulation and other functions were in the normal state. The description we have now given is that of an individual in good health. In fact, the only morbid phenomenon in this young man was the expectoration of a considerable quantity of pure, brownish blood, frothy on the surface. He himself said that if he did not see blood in his sputa, he would not consider himself ill. He was bled to a considerable extent from the arm, and a blister was applied over the chest. The hemoptysis ceased by little and little on the following days, and the patient was soon restored to perfect health.

Nothing proved that the lung in this individual contained tubercles. One could not, however, absolutely deny their existence, when we remember certain cases in which, without the health having been at first more changed than here after several attacks of hemoptysis, a period ultimately came when phthisis supervened.

Thus, sometimes a great number of years elapsed between the period when the first hemoptysis appears, and the commencement of the symptoms which characterise pulmonary phthisis; sometimes the first spitting of blood is immediately followed by the manifestation of the signs of pulmonary phthisis, which, in this case, in general assumes an acute form; sometimes, in fine, it is during the progress of pulmonary phthisis that spitting of blood shows itself at longer or shorter intervals. We may add that there are some phthisical patients who run through the different stages of their disease, and die without having ever spit blood.

There are some circumstances which exercise remarkable influence on the return of hemoptysis. Thus we have seen patients who could not experience the most ordinary mental emotion without being attacked with spitting of blood. We have seen another phthisical patient, who, at three different times, was attacked with hemoptysis every time that leeches were applied to his chest; this man told us that as long as the leeches bit he felt within his chest an intense heat, and at the same time a most painful oppression. In fine, it is not uncommon to see hemoptysis reappear in some phthisical females at their menstrual period, when the menses are irregular.

SECTION VII.

SIGNS FURNISHED BY THE SYMPATHETIC DISTURBANCES OF THE DIFFERENT FUNCTIONS.

75. Among these disturbances that of the circulation is most marked and most uniform, but it does not exist at all stages of the disease, and in all it is not similar to itself. Thus, most usually, tubercles commence without giving rise to any species of febrile disturbance ; then, according as they become multiplied or softened, erratic febrile movements are observed to appear. At a later period again, the fever returns every evening, whilst during the day there is none. Finally, at a still more advanced period, the fever no longer ceases, it is continued, but it is only redoubled at the end of each day. There are even some patients in whom two well-marked accessions are observed every day ; the one towards noon, and the other at night.

The accession at night very seldom commences by shivering ; most frequently it is marked only by a greater acceleration of the pulse, and a greater heat of skin ; at the same time the patients feel more oppressed, and their cough becomes in general more frequent and more painful. This accession lasts a portion of the night, and terminates towards morning by a sweat, the quantity of which varies according to the individual, and which is almost always confined to the head, neck, and chest. It is this sweat that characterises the hectic fever of pulmonary phthisis. Though it is a very frequent occurrence, it may however be wanting, and there are persons who die without ever having had it. Once established, it may be suspended for longer or shorter intervals, to reappear again. Its returns mark in general an exasperation of the disease. The attacks of hemoptysis often bring back this sweat, and it ceases with the spitting of blood, or a little time after it.

However characteristic the sweat of phthisical persons may be, it may, however, appear in other diseases, where its existence, combined with the general emaciation and other symptoms, may induce one to believe in pulmonary tuberculisation, though the latter may not exist. We shall never forget, with respect to this matter, the case of a young girl, who entered the La Pitié, affected with measles. During the six months preceding this, she had not ceased to cough, and, when the eruption disappeared, the cough continued. During the two following months we saw this young girl waste away rapidly ; the pulse was habitually frequent ; *profuse night sweats ;* there was some diarrhœa, and the cough did not cease. She complained of no oppression ; but said she felt rather an acute pain towards the interior and left side of the chest. In how many phthisical patients are not similar pains observed ? Auscultation and percussion afforded but negative information ; but we have above seen that this is the case also with many tuberculous patients. The girl, exhausted by continued fever, had arrived at the last stage of marasmus, when her lower extremities began to be infiltrated ; the diarrhœa continued constantly, as well as the sweats. This person became more and more exhausted, and died at last without having presented any new symptom.

On opening the body we found the lungs exempt from all appreciable lesion ; as also the heart. The spleen was changed into an immense abscess filled with a sanious and reddish pus. The veins of the lower extremities, the iliac veins, and vena cava, were completely obstructed by solid clots, which were externally red, and which consisted, towards their centre, of a whitish matter, which resembled, according to the points where it was examined, either pus of bad consistence, and granular, or softened encephaloid matter.

Thus, in this case, several of the symptoms accompanying pulmonary phthi-

sis were produced by an abscess developed in the spleen, a very uncommon lesion, to which probably we might refer the pain which the patient felt towards the lower part of the left side. The œdema of the lower extremities depended, no doubt, on the obstruction which existed in the veins of these extremities. With respect to the lesion which might exist between the alteration of the veins and the disease of the spleen, we shall, without seeking to determine, merely call attention to the coincidence.

76. We have now passed in review the ordinary modifications which the circulation undergoes in phthisical patients ; from what has been now said, it may be inferred that the fever does not supervene in these patients, or, at least, is not permanently established in them till a considerable time after the pulmonary tubercles have revealed their existence by different signs. However, there are cases in which the fever, far from closing the scene of the phenomena, on the contrary opens it, and together with the cough is the first symptom which appears. This is what happens in cases where persons who till then had appeared in good health, are simultaneously attacked with severe bronchitis and violent fever. Once the latter has commenced, it never ceases ; the cough also continues, emaciation supervenes, the patients waste away, the signs of pulmonary tuberculisation become more and more evident, and this affection, to which little importance was at first attached, and which had been called *catarrhal fever*, turns out to be phthisis. In such a case the fever may retain all its intensity ; death then rapidly supervenes. At other times the febrile disturbance disappears, or, at least, diminishes, and then the disease, acute at its onset, repasses into the chronic state, and phthisis, once declared, proceeds with its accustomed slowness.

Besides these cases, in which the fever exists from the first period of the phthisis, and marks its commencement, others of a quite opposite nature are met, where the fever, on the contrary, does not manifest itself, even when caverns are already formed within the lung. That seems to us to take place principally when the tuberculous excavation is surrounded by an almost healthy parenchyma, and when outside the point where this cavity exists, there are either no tubercles, or nearly none ; to explain these differences, we must have recourse to the individual dispositions of each patient. More than once have we been consulted by persons who complained of nothing but a cough, which they could not get rid of, and a slight oppression, which they mentioned only when questioned on this point. Besides, they had strength enough to continue the ordinary mode of living ; they made long journeys on foot; they were not very much emaciated, their pulse was natural ; nothing, in a word, indicated in them a lesion of the lungs already far advanced ; at the very most they appeared disposed to become phthisical. However, on auscultating them, we were not a little surprised to find towards the summit of either lung all the signs, which leave no doubt of the existence of a cavity ; in the remainder of the pulmonary parenchyma, this respiratory murmur was pure. Of the last stage of phthisis, then, these persons had no sign but the anatomical lesions which characterise it ; they had not any of the general symptoms ; the fever in particular was completely absent in them. Before auscultation was employed, could such facts have been suspected ?

77. In treating of the functional disturbances presented in phthisical patients by the circulatory apparatus, let us say a word of the liquid contained in this apparatus, namely, the blood. In these patients, when they have attained a far advanced stage of the disease, it presents a very remarkable modification ; that is a buffy state, as well marked as in acute pleuro-pneumonia, or in articular rheumatism. In all, the blood drawn from the vein has identical characters ; it presents a small clot, surrounded by a great quantity of serum, and covered with a white, thick clot, with raised edges. It is precisely the same

appearance as that which is presented by blood in almost all cases of acute articular rheumatism. What then is the common tie which, with regard to the qualities of the blood, connects two affections in all respects so very unlike?

CHAPTER III.

OF THOSE DISEASES WHICH COMPLICATE PULMONARY TUBERCLES.

78. It is very seldom that on opening the dead bodies of phthisical patients no other lesion is found except tubercles developed in the lung. Traces of acute or chronic affections are most usually met either in the respiratory apparatus itself, or in other organs. Sometimes these different affections appear to be developed only when the pulmonary parenchyma already contained tubercles; sometimes they appear to have preceded the formation of these; sometimes too, they concur in their production. In all cases their study is no less important than that of tubercles themselves; on the existence of these intercurrent diseases important modifications depend, either in the group of symptoms by which phthisis is announced, or in its progress, or in its treatment. It is by them more than by pulmonary tubercles that several patients are prematurely hurried to the grave. Manifesting themselves sometimes by symptoms more marked than tubercles of the lung, these diseases fix the attention more or less exclusively, and the accidental production which has attacked the pulmonary parenchyma may then be readily overlooked. In the number of these complications, we shall not forget that which has most generally gained attention, since the splendid works of Bayle and Laennec, namely, the simultaneous existence of tubercles in different organs. Very recently M. Louis has published the results of his laborious researches on the degree of frequency in which tubercles are observed in different organs: but as this matter has already been sufficiently explained, we shall not dwell on it here, unless, however, when we may find it necessary, in order to discuss what must be understood, according to us, by the term *tuberculous diathesis*, which has been so variously interpreted.

ARTICLE I.

DISEASES WHICH COMPLICATE PULMONARY TUBERCLES, AND WHICH ARE SEATED IN THE RESPIRATORY APPARATUS.

79. The diseases to be considered in this article may be looked on as almost constant, or at least as very frequent, in those cases in which tubercles exist in the lung. The symptoms to which they give rise have not always been sufficiently distinguished from those which depend solely on tubercles exempt from all complication; these symptoms are often much more marked than those appertaining to tubercles. They are so much the more important to be known, as the organic lesions whose existence they disclose may be combated, arrested in their development, and even destroyed by the resources of art. This is a truth, which several practitioners do not seem to feel, who, convinced, with more or less reason, that tubercles themselves cannot be cured, are not sufficiently careful to oppose an active treatment to the different diseases which may complicate those tubercles. However, by combating these complications, we remove symptoms oftentimes more serious, and, above all, more distressing to the patient, than those depending on the tuberculous affection itself: and moreover, this is certainly one of the best means by which we can endeavour to ren-

der tubercles stationary, or at least to retard their development and progress, or finally, to favour their re-absorption, if it be possible. For if it cannot be doubted that the presence of tubercles in the lungs, is the cause of several other diseases of the respiratory apparatus, such as bronchitis, pneumonia, pleuritis, observation also teaches us, that these diseases, in their turn, give a destructive activity to the process of *tuberculisation ;* that at other times it is they which produce it at first, then disappear, or at least become more or less latent, in order to be reproduced at a subsequent period, when under the influence of these same diseases, which may be considered as a first agent of impulsion, the tubercles shall be more and more multiplied, and shall by their presence irritate the surrounding parts. Thus, in this sort of connexion of phenomena, the same lesion is alternately cause and effect. The same is observed in a number of other cases. See, for instance, the numerous changes which the conjunctiva may undergo after an ophthalmia. After all vascular injection has disappeared, the continuance of one or more pustules, of pterygium, of excrescences of different forms, alone attests the previous existence of inflammation ; but from time to time, we see the latter renewed around the pustule, or excrescence, which in this case is to the conjunctiva what the tubercle is to the lung. If the pathological process, which here takes place before our eyes, had occurred internally, the precise period of its commencement might have easily escaped us, and in the inflammation we could see nothing but a phenomenon consecutive to the development of the morbid production of the conjunctiva. The same may be said of several spots which show themselves on the transparent cornea, consecutively to an attack of ophthalmia. It is, besides, a remarkable circumstance that, in a great number of cases similar to the preceding, in which inflammation is at once both cause and effect, the process of irritation which precedes the alteration of nutrition is oftentimes much less marked and much less severe than that which follows it. This is very evident, for example, with respect to inflammation of the pulmonary parenchyma, considered as cause or as effect of the development of tubercles. It is again more manifest for encephalic tubercles, whose production, in a great number of cases, is preceded by symptoms of inflammation or irritation so very obscure, that, in these cases, we can no longer admit the latter as a producing cause of cerebral tubercles, except by analogy with that which occurs in other organs.

SECTION I.

DISEASES OF THE LARYNX, TRACHEA, AND BRONCHI.

80. The different tissues whose aggregate constitutes the parietes of the air-passages, from the larynx to the last extremities of the bronchi, present alterations, variable in their nature and their intensity, in almost all the individuals affected with pulmonary tubercles.

81. The slightest degree of these changes is a simple redness of the mucous membrane of the larynx, trachea, or bronchi. With respect to its extent, we perceive this redness to be sometimes nearly general, and even to occupy bronchial tubes distributed to lobes exempt from tubercles ; sometimes the bronchi are but partially red, and then this redness exists principally in the vicinity of the largest and most numerous tubercles ; it is in general brightest where the tubercles are already softened and succeeded by caverns. It is not uncommon to find considerable redness only in the small bronchi ; the colouring diminishes in the larger, and finally, the trachea is found to be white, as also the larynx. The contrary arrangement is less common.

82. In a very small number of patients only, the inner surface of the air-passages, carefully examined, as far as the points where the instrument was no longer able to trace them, presented the most perfect whiteness; in these patients there was as yet no tuberculous excavation. Shall we conclude from this absence of bronchitis that, in cases of this kind, the tubercles were developed in the lung independently of any irritation of the bronchi? Such a conclusion would be any thing but correct; for here, as in several other tissues, the inflammation may have disappeared; thus severe urethritis disappears spontaneously, and in a manner before our eyes, when the testicles come to be engorged. Thus we have seen, in the Hôpital des Enfans, young patients in whom the lymphatic ganglions of the neck remained tumefied, and had become tuberculous a long time after the disappearance of a chronic inflammation of the hairy scalp and of the skin of the face. An individual, affected with phymosis, was subject to frequent inflammation of the inner surface of the prepuce and gland. During the course of one of these inflammations, which was more severe than usual, the superficial and deep-seated lymphatic ganglions of the two groins became large and painful; the patient, having entered the La Charité, was operated on by M. Roux; from that time he was no longer subject to the bastard gonorrhœas, which he so often experienced up to the moment of the operation; the *engorgement of the inguinal lymphatic ganglions diminished, but did not disappear.* Some months later, this individual entered the La Charité, into the wards of M. Lerminier, for a pulmonary catarrh; from him it is we have the preceding details. Then the gland and prepuce were perfectly sound; but in each groin several lymphatic ganglions retained considerable size. What appeared at first to be but simple bronchitis was soon considered by M. Lerminier as tubercular phthisis; the latter became more and more manifest, and soon terminated in death. The *post-mortem* examination demonstrated the existence of numerous tubercles, either crude or softened, in each lung. In each groin there appeared beneath the skin and between the muscular layers large lymphatic ganglions, of a livid red externally; when cut into, several presented, in the midst of this red colour, granulations of a yellowish white colour, which seemed to us to be rudiments of tuberculous matter; in the pelvis, along each upper strait, and anterior to the lumbar vertebræ, there was a chain of these same ganglions, which, whilst they were larger than ordinary, presented three different appearances: some were uniformly red; others of a red colour, mixed with white points; the third presented through their entire extent a yellowish, friable mass, in the midst of which the red colour presented itself only in isolated points.

These facts seem to us important, inasmuch as they show, beyond all doubt, how the disturbances evidently produced by an inflammation, more or less remote from the place where it is developed, may continue and even increase after the primary inflammation has completely disappeared. And may not what we have just now seen to occur before our eyes in the preceding cases also take place in the internal organs, in the glands of the mesentery, for instance, consecutively to an enteritis, in one of the anatomical elements of the lung, consecutively to a bronchitis? M. Broussais has already satisfactorily proved this; but what we cannot grant him is, that the case is always so. We conceive and admit that, in a very great number of cases, inflammation of the liver succeeds duodenitis; that inflammation, and then *tuberculisation* of the mesenteric ganglions, succeed enteritis: but physiology, which teaches us that every organ carries causes of disease in itself, also inclines us to admit that these different organs may be affected or diseased primarily. The previous existence of bronchitis then does not seem to us absolutely necessary in all cases to the development of pulmonary tubercles; for the production of these, it is quite sufficient to conceive a point of irritation, a modification of nutrition in the place where they

take their rise. Why do we here again repeat this discussion which has been already given? It is in order that the sound state in which the bronchi are sometimes found, may not serve as an argument to prove that pulmonary tubercles may be developed without previous bronchitis.* This absence of redness, or of any other lesion, does not seem to us to decide any thing either for or against.

The absence of redness of the bronchi in certain phthisical patients where tubercles are still crude, or even more or less softened, should coincide with the absence of cough and of expectoration; some cases already cited showed this. The intensity of the one and profuseness of the other should be in the direct ratio of the inflammation of the bronchi: we must except the cases where the expectorated matter is formed by tuberculous cavities.

83. In a preceding portion of this work, we have already marked several of the changes which the larynx, trachea, and bronchi undergo, consecutively to their chronic inflammation. We must here principally confine our attention to such alterations as coincide particularly with the existence of pulmonary tubercles. We shall describe them successively in the larynx, trachea, and bronchi.

84. In three-fourths at least of the phthisical patients treated in the wards of M. Lerminier, the larynx was found affected in different degrees. Among the different tissues which enter into its composition, the mucous membrane is that which has presented to us the most frequent lesions. In the majority of cases the tissues subjacent to it are only changed consecutively.

We have already spoken of the mere redness, without any other lesion, of which the mucous membrane of the larynx, as well as that of the rest of the air-passages, may be the seat. Sometimes this redness attacks the entire of the larynx, sometimes it is partial. Frequently enough, for instance, we have seen it occupy only the laryngeal surface of the epiglottis; at other times it attacked only the bottom of the ventricles: so that at first sight the larynx seemed to be perfectly healthy. In phthisical patients, whose voice was for a long time changed, we have found in the larynx no other lesion but this redness confined to the bottom of the ventricles; a remark interesting enough in a physiological point of view, since it proves how necessary to the integrity of the voice is the perfect integrity of all the parts of the larynx. The cause of the alteration of the voice, in the case of mere redness of the bottom of the ventricles, principally depended in all probability on the mucosity, which secreted more copiously than usual, filled and obstructed the ventricles.

Many phthisical patients have presented to us a perceptible softening of the mucous membrane of the larynx. Sometimes this softening was carried so far that the thyro-arytenoid ligaments, which constitute the chordæ vocales, are no longer covered except with a sort of liquid pulp, which has taken the place of the mucous membrane; in some cases, in fine, we no longer find even a vestige of the latter, and the thyro-arytenoid ligaments are entirely exposed. Thus, in certain softenings of the gastric mucous membrane, this membrane, at first liquified, is then completely destroyed, so that the substances taken into the stomach are in immediate contact with the sub-mucous cellular tissue.

The laryngeal mucous membrane may also present perceptible increase in thickness, whether it becomes hardened, or softened, or retains its ordinary consistence. The portion of membrane covering the two surfaces of the epiglottis sometimes exhibited remarkable thickening with induration of its tissue. The epiglottis in this state had lost its elasticity and natural mobility, it had acquired

* More frequently even than in the human subject, I have found in the horse the bronchi perfectly white throughout their entire extent, though tubercles existed in the lung. But these tubercles were small and but few in number; the parenchyma between them was sound. In the horse as well as in the human subject, the bronchi appeared to me red, in different degrees every time that the tubercles were softened, were replaced by caverns, and the pulmonary parenchyma around them was hepatised.

three times or four times its natural thickness, and the site of this increase of thickness was exclusively the mucous membrane. But what was principally remarkable was the deformation which the epiglottis had undergone: its free edge, instead of being sloped, was blunt and rounded, which depended on considerable puffiness of the mucous membrane lining this edge. This thickening of the mucous membrane of the epiglottis coincided with a brownish colouring and with other changes in the larynx.

On one occasion we saw the portion of mucous membrane lining the bottom of the ventricles so increased in thickness, that it went beyond the level of the chordæ vocales, between which it projected, and the cavity of the ventricles no longer existed.

The laryngeal mucous membrane may become thickened, partially puffed, and produce on its surface vegetation, fungous growths, and tumours of various size and form. Thus, in a phthisical patient, who, besides an almost total extinction of voice, had complained during his stay in the hospital of an habitual sensation of uneasiness and constriction towards the region of the larynx, we found the space interposed between the chordæ vocales diminished by one-third in the transverse direction by a reddish, soft, pediculated tumour, which arose from the bottom on one of the ventricles and projected a little beyond the level of the chordæ vocales. With respect to its form and texture, it presented great resemblance to certain tumours called polypus, which, arising by a thin pedicle from one of the surfaces of the neck of the uterus, pass forwards, like prolongations or appendices of the mucous membrane, between the lips of this same neck. In another individual, equally affected with pulmonary tubercles, the portion of mucous membrane extending from the upper opening of the larynx to the upper chorda vocalis, was surmounted by a rounded tumour of the size of a large pea; it was hard, and formed by the union of a great number of small whitish granulations, which gave it the appearance of certain syphilitic vegetations of the rectum, called cauliflower by medical men.

The secretion of the mucous membrane of the larynx, when in the state of chronic inflammation, presents an alteration which we think should be noticed here: it is the production of false membranes which, by their form, by their consistence, and by their site, perfectly resemble some of the numerous varieties of the false membranes of croup. In several phthisical persons whose voice is completely extinct, or at least very much altered in the last period of life, we have found the larynx, and particularly its ventricles, lined by a membranous layer of greater or less density. Under the same circumstances we have seen the two surfaces of the epiglottis covered, and as it were, incrusted with a similar layer. Thus, then, membranous laryngitis, or croup in the chronic state, seems to us to be an affection which is far from uncommon in phthisical patients. It may give rise to phenomena which vary according to the site and thickness of the false membranes. In the majority of cases, however, it did not seem to us to produce particular consequences or peculiar symptoms. The breadth of the larynx in the adult is no doubt a reason which renders the formation of false membranes on the vocal organ much less alarming than in the child.

The follicles which exists in great numbers in the mucous membrane of the larynx, may be affected either simultaneously with the rest of the membrane to which they belong, or separately. One of the affections of these follicles which is in some measure intermediate between the healthy and morbid state, is their unusual development. They then appear in the form of small greyish granulations scattered over the laryngeal mucous membrane. The existence of these granulations coincides often with other alterations in the larynx, the results of its chronic inflammation; so that here, as in the intestine, hypertrophy of the follicles is connected with an inflammatory process.

Oftentimes the entire inner surface of the larynx is covered with small spots

of a duller white than the rest of the mucous membrane, projecting considerably above the latter, surrounded by a red circle as by a sort of vascular crown, and sometimes presenting in the centre another red point. These spots have been taken for erosions or superficial ulcerations of the mucous membrane. We think that such is not their nature; the regular form which they assume, the projection which they present, the injection both of their circumference and of their centre, like the two vascular circles of the iris, incline us to consider these spots as inflamed mucous follicles. That becomes quite evident, when these same spots are examined in the intestinal canal of the human subject, and particularly of that of the horse, where their greater development allows us to discover their nature.

The follicles of the larynx, like those of the intestine, being more voluminous and reddened by inflammation, represent pustules or boutons, which tend to terminate in ulceration. At other times, these same pustules or boutons, which are but enlarged follicles, lose their red colour, and acquire a dull white or yellowish tint, which indicates the existence of a purulent secretion within them. If they continue to increase in size, the result may be small abscesses, of nearly equal size, scattered over the inner surface of the larynx, as we had an opportunity of observing once in a girl thirteen years of age (in the Hôpital des Enfans, under the care of M. Gadelot, in 1821). At other times, the pus secreted by the follicle is concrete and grumous; there then result small hard and round tumours, situate, as the follicle, beneath the mucous membrane, and designated in the larynx, as in the intestine, by the name of *tubercles*. At the end of a certain time, the concrete, semi-solid pus, which more or less resembles the clots (*grumeaux*) secreted by the false membranes which line the inner surface of certain abscesses; this pus, I say, this tuberculous matter as it is called, tends to escape, by virtue of a general law, from the cavity where it is formed, and, in order to that, there is set up in the mucous membrane an inflammatory process which terminates in ulceration, which at first was probably but an enlargement of the orifice of the follicle. No doubt it would be going beyond facts to affirm, that all the tubercles of mucous membranes are but diseased follicles; but we conceive that this may be admitted in a great number of cases, for which we rest principally on the following reasons: —

1st. In the mucous membranes, the form, disposition, seat, mode of development, the termination of tubercles in ulceration, resemble the form, seat, etc., of follicles, whether in the healthy or inflamed state.

2dly. On the skin we have had an opportunity of seeing follicles become changed, develope themselves, become filled with pus, and then become almost similar to the tubercles of mucous membranes, more especially when the pus which filled them had a certain degree of consistence.

3dly. In the horse, where the mucous cryptæ are much more developed than in man, we have been able strictly to trace the numerous changes which these cryptæ or follicles are capable of undergoing. We have seen them become filled with fatty, sebaceous, gelatinous matter, so as to resemble atheromatous, meliceritic tumours, real cutaneous pimples. We have seen their parietes indurated and thickened, and become fibrous and cartilaginous. Surely if the most accurate observation leaves no doubt regarding the reality of these extraordinary transformations of the follicle, does not analogy also lead us to admit the possibility of its transformation into what is called tuberculous matter?

Whatever may be thought of this ætiology, one thing is quite certain, that in phthisical patients the mucous membrane of the larynx is often found raised in different points of its extent by small rounded points, of a dull white or yellowish colour, called tubercles. The mucous membrane above them often presents no appreciable alteration; at other times it is inflamed in different degrees, and always, at the end of a longer or shorter time, it has a tendency to

ulcerate, in order to give exit to the tuberculous matter collected beneath it. There is nothing to prove that such is the origin of the greater number of ulcerations of the larynx; it is less common than it is generally said to be, to meet tubercles in the larynx in phthisical subjects; they are certainly much more uncommon than intestinal tubercles.

Whatever be the origin of the ulcerations of the larynx, observation satisfies us that they are common enough in phthisical patients. The following will present the substance of our researches on this head: —

Nothing is more variable than the extent of the ulcerations of the larynx. They often occupy so small a space, that they very easily escape being perceived. At other times all the inner surface of the larynx presents one entire ulceration. In the midst of this extensive solution of continuity, we here and there perceive merely the debris of the mucous membrane, which appear like red irregular vegetations in the midst of a surface whose colour and appearance vary according to the tissues which constitute it.

These ulcerations considered in reference to their form may be regularly or irregularly rounded, oval, oblong, sinuous, or linear. Their edges may be either on the same level as their lower part, or more or less elevated above it.

Their number is in general in the inverse ratio of their size. There are some cases in which all the inner surface of the larynx is, as it were, perforated (*criblée*) by a very great number of small ulcerations separated by portions of membrane, which present no other alteration than a variable redness. The latter is sometimes marked only on the very edge of the ulceration, and then the mucous membrane seems covered over with a great number of small red circles. In some cases, however, there is found only one, and that a very small ulceration.

In another part of this work, we have called attention to the ulcerations of the intestinal mucous membrane, with perfect whiteness of their lower part, their edges, and of the membrane which surrounds them. The same whiteness is observed in certain cases of ulcerations of the larynx. Such a fact is very important, inasmuch as it proves that a mucous membrane may be seriously altered though it may present a natural colour. There is no point of the larynx where ulcerations are not found. They are very common in the chordæ vocales, which they often destroy to a great extent. The inner surface of the cricoid cartilage is frequently the seat of some, which are remarkable in this respect, that they are always numerous, small, and all nearly similar. It is not uncommon to find the portion of mucous membrane lining the re-entrant angle of the thyroid cartilage, at the anterior commissure of the two thyro-arytenoid ligaments, the seat of a small ulceration. Finally, ulcerations are found not unfrequently on the mucous membrane lining the bottom of the ventricles; their existence should be noticed, as they may easily escape investigation, and yet they may be the only lesion found in the larynx of persons whose voice was for a long time changed.

Among the ulcerations of the larynx, some extend only in breadth, and consist merely of a simple solution of continuity of the mucous membrane; their bottom is then formed, either by the different tissues immediately situate beneath the mucous membrane, such as ligaments, muscles, cartilages, etc., or by a layer of cellular tissue of more or less thickness, which, being very thin and scarcely perceptible in the normal state, is hypertrophied, or indurated, or becomes the seat of a morbid nutrition; thence fungous growths and vegetations which are raised from the bottom of certain ulcerations of the larynx, thence also the tubercles which traverse them.

Other ulcerations differ perceptibly from the preceding in this, that they extend principally in depth. Then the different anatomical elements which enter into the composition of the larynx may be altered and destroyed in a longer

or shorter time. The fibrous tissue which constitutes the thyro-arytenoid ligaments is one of the parts most frequently attacked by ulceration. The white and shining fibres which constitute these ligaments acquire a duller colour, approaching that assumed by fibrous tissue when subjected to long-continued maceration; at the same time they become softened in separate fasciculi; one would say that the inflammation which has attacked them brings them back to cellular texture; being gradually reabsorbed they disappear; the thyro-arytenoid ligament then exists merely in the form of debris, it may even happen that no trace of them whatever is to be found, and the bottom of the ulceration is then formed of the muscle of the same name. Every time the chordæ vocales have undergone the alterations now mentioned, the voice itself is very much altered. We have thought that the lesion of one chorda vocalis alone, though very extensive, occasioned a less complete loss of voice than a lesion of the two chordæ vocales, much less serious, but simultaneous. These facts accord with those disclosed by experimental physiology regarding the use of the ligaments of the glottis in the production of the voice.

The thyro-arytenoid muscle itself, which we have seen to form the bottom of several ulcerations, consecutively to the complete or incomplete destruction of the chordæ vocales, may in its turn undergo different alterations. Sometimes we have found its fibres, as it were, dissected and separated in fasciculi by a gelatinous, puriform serous liquid; at other times, a sort of concrete pus, or matter called tuberculous, was deposited in its substance in the form of granulations, of small masses or whitish clots. In two cases this muscle appeared to us really atrophied: the place which it usually occupies was in a great measure taken possession of by reddish masses of cellular tissue, between which were scarcely distinguished some pale and colourless fibres of the muscle. In a greater number of cases this same muscle has been found considerably softened: its fibres were reduced to a sort of pulp; in other parts they no longer existed, as if the muscle had been subjected to an external violence which had lacerated it; finally, in some phthisical subjects we no longer found any trace of it: on one occasion, the lateral crico-arytenoid muscle was destroyed at the same time, and the bottom of the ulcer consisted of the cricoid cartilage partly ossified. Experiments on living animals have taught that the action of the thyro-arytenoid muscle is necessary to the production of the voice; this is also confirmed by pathological facts; for every time we have found this muscle more or less changed, the voice was also modified.

When one of the cartilages of the larynx constitutes the bottom of the ulcerations, this cartilage is often seen to be changed; its surface, divested of its perichondrium, becomes rugged and uneven; its tissue, which is homogeneous and pervaded in its healthy state only by white liquids, is penetrated by the red part of the blood, which is observed there in the form of reddish streaks or points; and in the midst of this change of texture produced by inflammation, we often observe rudiments of osseous matter which replace the cartilaginous tissue. Thus this change, a natural and ordinary consequence of the progress of age, is here accelerated, and as it were prematurely developed under the sole influence of the inflammatory process, which extends from the soft parts to the cartilages of the larynx. A remarkable phenomenon, which leads us to regard as identical, with respect to their results, the normal process of nutrition and the process of inflammation.

The articulations which unite the different cartilages are themselves sometimes considerably affected. In one phthisical subject, in addition to ulceration of the larynx, the ligaments were found entirely destroyed, which in the normal state keep the arytenoid and cricoid cartilages in contact. The crico-arytenoid articulation, which was really luxated, was bathed in a great quantity of purulent liquid. The anterior part of the arytenoid cartilage of this same side was

itself corroded, become rugged, and partly ossified. These alterations coincided with considerable ulceration of the left chorda vocalis, which extended as far as the arytenoid cartilage. In this person, who was forty-eight years old, the voice was merely become hoarse, but not extinct; deglutition, and attempts to cough, excited pain towards the region of the larynx.

An ulceration very inconsiderable in breadth, but which is deep, may by reason of its situation cause very serious disturbance. Such is the following case: — A man, presenting all the symptoms of far advanced pulmonary phthisis, entered the hospital in the summer of 1817. Towards the upper extremity of the obtuse angle which the thyroid cartilage presents over the median line of the neck, there existed a very small solution of continuity, with rounded edges, scarcely capable of admitting a large pin's head, and through which a little air escaped with a hissing noise every time the patient inspired or expired with force. The voice was merely weak, without any other modification. On opening the body, no other alteration was found in the larynx except a round ulcer, which might admit an ordinary sized pea, and which was situated in the re-entrant angle formed by the union of the two laminæ of the thyroid cartilage, a little above the anterior commissure of the upper chordæ vocales. In the space occupied by this ulcer the mucous membrane was destroyed; the bottom of it was formed by the thyroid cartilage, which at the centre presented the slight loss of substance, whence resulted the fistulous opening discovered during life. What is remarkable in it is this, that, though existing for nearly a year, this fistula neither increased nor diminished in extent. Its situation also accounts for the preservation of the voice. This is the only time we had an opportunity of observing a fistula of the larynx in the phthisical patients treated at La Charité for several years back, that is to say, in nearly two thousand persons. This proves, at least, that these fistula are very rare.

Other fistulous passages, not affecting the cartilages, may form in the very substance of the soft parts of the larynx. In one phthisical patient, twenty-five years of age, the posterior portion of the right ventricle of the larynx presented a fistulous opening, which, proceeding posteriorly and outwards, terminated in a cul-de-sac anterior to the arytenoid cartilage of this side. The opening of this fistulous passage was gaping, and was about a line in diameter; its edges were smooth, round, without any trace of inflammation, as if they had been those of a natural opening; towards the bottom of it, purulent matter, which was yellowish and inodorous, was collected. Several other facts of a similar nature was observed at the La Charité. In all the fistulous passage occupied the same point. It was observed to terminate near one of the sides of the arytenoid cartilage, or else to enter the articulation of this cartilage. It might be conceived, by analogy with what passes elsewhere, that this articulation is in certain cases the part primarily diseased, and that it is the commencement of the fistula. Be that as it may, in the case now cited, and in others similar, there was complete aphonia.

The cellular tissue subjacent to the fold of mucous membrane which constitutes the aryteno-epiglottic ligament, presented to us serous infiltration so great, that the raised mucous membrane formed on each side of the upper opening of the larynx a considerable swelling which partly obliterated this opening. Twice we have seen this infiltration commenced during life by the symptoms of œdema of the glottis, such as they have been described by Bayle. In other individuals we saw nothing of the kind. But what we think should be noticed here is, that, every time we found this œdema, there was at the same time well-marked chronic laryngitis, so that the serous infiltration was, in the cases seen by us, merely an additional phenomenon. Thus in most of the cases where we have found sub-mucous œdema of the intestinal canal, the mucous membrane presented traces of chronic inflammation in its colour, consistence, thickness, and in the

nature of the liquids which lined it. We do not mean to say that the submucous œdema of the intestines or larynx may not, as well as the sub-cutaneous œdema, exist without inflammation; but from the preceding facts we may conclude that several of these cases of œdema should be referred to, or at least are connected with an inflammatory state of the mucous membrane. Thus a limb becomes infiltrated around old cutaneous ulcers.

84. After having traced the principal changes observed in the larynx of phthisical patients, we shall now endeavour to collect the aggregate of the symptoms which have marked these alterations during life.

The modifications of the voice must first engage our attention.

Here redness, with slight swelling of the mucous membrane lining the chordæ vocales or the ventricles, is sufficient to produce a perceptible change in the timbre of the voice.

Ulceration of these same parts of the mucous membrane produces a change in the voice, which oftentimes does not exceed that occasioned by mere swelling of the membrane.

In these two circumstances, the change of the voice seems to depend — 1st. On an unusual accumulation of mucus or of pus in the ventricles; 2dly, on the modification which the thyro-arytenoid ligaments necessarily undergo in their texture, and consequently in their elasticity, when they are no longer covered by mucous membrane.

The ulcerations which exist in other parts of the mucous membrane, and especially between the anterior or posterior extremities of the chordæ vocales, produce no perceptible alteration in the voice.

Tumours of different kinds, which rise from the bottom of the ventricles and obstruct them, render the voice hoarse, and as it were resembling the sound of a rasp (*râpeuse*). A considerable tumefaction of the mucous membrane of the ventricles produces the same effect.

The more or less complete destruction of one of the chordæ vocales, the other being intact, often produces not more disturbance in the voice than the preceding lesions; at other times, on the contrary, it is sufficient to produce aphonia.

The aphonia is complete if the two thyro-arytenoid ligaments are simultaneously changed.

The extinction of the voice is carried to the highest degree if the thyro-arytenoid muscles have undergone one of the alterations already noticed.

These different facts fully confirm those disclosed by experimental physiology.

Neither should we forget, that, by the mere fact of nervous influence, the voice may undergo a great number of modifications with respect to its strength, its timbre, its different tones, without pathological anatomy being in any way able to account for them.

The chronic laryngitis of phthisical persons is an affection most usually free from pain. Ask the patients in whom, after death, the larynx is found ulcerated and most seriously disorganized; the greater part of them will affirm that they feel at most but a little constriction or heat in the throat, and it is actually only in some exceptional cases that they feel real pain. In the latter case, the *post-mortem* shows no other lesion than is observed in those who have never suffered any pain in the larynx. This frequent absence of pain is here a phenomenon so much the more remarkable, as the larynx, in the healthy state, is the seat of exquisite sensibility, as may be readily proved by the following experiment: — In a living animal, make an incision into the trachea, immediately below the cricoid cartilage; introduce a probe through the opening, carry it into the larynx; the animal will evince the most intense uneasiness; he will make the greatest efforts to free himself from the pain which he seems to suffer. Carry the same instrument into the trachea, depress it as far as the origin of the bronchi; the

animal will remain calm. This great sensibility of the larynx is connected with the quantity, size, and nature of the nerves which are distributed to it; and yet it is not excited, or but seldom so, by the stimulus of inflammation: so true is it that we cannot always argue from what happens in the healthy state to that which will happen in the morbid state. Here again, as in a thousand other circumstances, we must admit as the expression of a fact a susceptibility extremely variable according to the individuals, by virtue of which such a lesion of an organ will be free from pain in one, and will excite in another the most intolerable sufferings; will announce itself in one case only by some local symptoms, and in another case will produce universal disturbance of all the functions, etc. Hereafter we shall also see intestinal ulcerations, so common in phthisical patients, develope themselves in them still more completely free from pain, than ulcerations of the larynx.

Chronic laryngitis appears to contribute to the increase of the dyspnœa in phthisical subjects only when the ordinary calibre of the larynx is perceptibly diminished in some point of its extent, either by unusual tumefaction of the mucous membrane, or by a tumour which rises from the surface of this membrane, or which, being developed in the subjacent parts, pushes it before it, or by an œdema of the glottis, etc.

85. What relation between the development of chronic laryngitis and that of pulmonary tubercles? The following is what observation has taught us on this point: —

In several persons inflammation of the larynx is the very commencement of the disease.

In others it is only during the course of pulmonary phthisis, at a more or less advanced period of the disease, that the larynx begins to be seriously affected, as if, in this case, the inflammation had been propagated from below upwards, by a course contrary to what it had assumed in the preceding case. Again, consecutive laryngitis appears to us more common in phthisical subjects than the primary. But even in the case where the larynx has become affected only consecutively to the lungs, it may happen that the tubercles of which the latter are the seat, are discoverable only by opening the body; so that in cases of this kind one would naturally be led to refer the cough, the dyspnœa, hemoptysis, marasmus, and hectic fever solely to the affection of the larynx, which is sufficiently characterised by the change of voice; in a word, one would admit the separate existence of laryngeal phthisis. But observation shows that nothing is more uncommon than this latter affection existing independently of pulmonary phthisis. This is proved by the autopsy. Thus, then, even when in a person who presents symptoms of chronic laryngitis, with emaciation and other signs of phthisis, nothing indicates the existence of pulmonary tubercles, the probabilities for admitting these are so strong as to be almost equivalent to certainty. Besides, in a certain number of cases, it is only by the autopsy that one can acquire the conviction that the lungs contain tubercles, and that laryngitis, which seems to be the principal disease, is really but a secondary affection. Such is the case when, amidst the numerous tubercles seated in the pulmonary parenchyma, none of them are sensibly softened, and when the pulmonary tissue around them has continued pervious to air. Then auscultation and percussion can afford no information. At other times, after the affection of the larynx has alone been announced by characteristic symptoms for a longer or shorter time, the disease of the lung begins in its turn to manifest its existence, whether cavities succeed to softened tubercles, or whether the pulmonary parenchyma around the latter is inflamed and indurated.

86. It must not, however, be supposed that the rules which we have now laid down with respect to the connexion of chronic laryngitis and pulmonary tubercles are so constant, that there are not some cases in which a mere

affection of the larynx may give rise to all the symptoms of pulmonary consumption.

87. From the facts now stated we shall draw the following conclusions: —

1st. Chronic laryngitis may exist idiopathically as acute laryngitis. But it is only in very rare cases that it alone can occasion symptoms of consumption. Laryngeal phthisis is then an affection not at all common.

2dly. In most of the cases where symptoms of phthisis accompany an affection of the larynx, these symptoms must be referred to tubercles developed in the lung, whether these tubercles may have followed or preceded the laryngitis.

88. Perhaps this would be the place to establish an approximation between the different lesions so frequently observed in the larynx of phthisical patients, and the affection of the nasal fossæ of horses, known by the common term glanders. Professor Dupuy, in his splendid work on this disease, has proved that the glanders of horses is produced by tubercles developed in the nasal fossæ. We have had an opportunity of opening a great number of glandered horses, and have been able to verify the accuracy of the opinion published by this distinguished veterinary organ.

In almost all the glandered horses which we have examined, the lungs contained tubercles varying in number and in size. But in some the affection of the lung was as yet very slight, merely a few tubercles were scattered through its parenchyma, whilst the disease of the nasal fossæ had been carried to a very high degree. In others, on the contrary, numerous and vast cavities already filled the lungs, and still the disease of the nasal fossæ appeared as yet only at its commencement. Finally, in other horses, the nasal fossæ and pulmonary parenchyma were affected nearly equally.

Glanders traced in its different phases of development has presented different species of lesions, which were probably but different degrees of the same alteration.

Often, for example, the nasal fossæ of phthisical horses presented no other modification of their normal state than greater or less redness of the mucous membrane, with puffiness of its tissue, injection and thickening of the cellulo-fibrous tissue which lines it.

In other horses, round granulations arose in greater or less number from the mucous membrane, altogether resembling hypertrophied mucous follicles, whose orifice was sometimes dilated, sometimes, on the contrary, less apparent than usual; around these follicles we often found the mucous membrane inflamed, at other times it was white, or exhibited at most but slight vascular injection, whether the previous inflammation of this membrane had disappeared, leaving behind it no trace except hypertrophy of these follicles, or the latter were inflamed independently of the mucous membrane, one of whose elements they constitute. Thus we daily observe idiopathic separate alterations of the cutaneous follicles, the skin which surrounds them remaining apparently healthy. Thus long trains of lymphatic ganglions are inflamed and engorged, without the cellular tissue through which they pass at all participating in their inflammatory state.

Among these follicles some were more or less red, others greyish; others had a whitish colour, which seemed owing to some purulent matter which filled their cavity. Finally, in several the pus was more concrete, of a yellowish white, and there resulted from it a small round and friable body which constituted what is ordinarily called a tubercle, but which, on comparing it with the other granulations which surrounded it, seemed to be nothing but a diseased follicle. This matter, called tuberculous, was oftentimes so abundant that it covered the greater part of the pituitary membrane.

On the other hand, the cellulo-fibrous tissue, subjacent to the mucous mem-

brane, likewise presented remarkable alterations. Being in a state of chronic inflammation, it was changed into a whitish substance, sometimes hard and breaking under the scalpel, like scirrhus, sometimes friable and approaching to tubercle.

Finally, as a common termination of these different alterations, the pituitary membrane presented ulcerations varying in form and in size, the bottom of which was formed sometimes of the indurated cellular tissue, which was frequently studded with small tuberculous masses, sometimes of the cartilages themselves, more or less altered, frequently injected with blood and tending to become ossified.

Thus in the horse, as in man, the upper part of the respiratory passages (for in the horse the nasal fossæ serve much more directly to respiration than in man) scarcely ever undergo any serious alteration without tubercles existing in the pulmonary parenchyma. The nasal fossæ of glandered horses have also presented lesions closely resembling those whose existence we have discovered in the larynx of men affected with pulmonary phthisis.

89. When treating of simple pulmonary catarrh in the preceding part of this volume, we already pointed out certain alterations of the trachea and bronchi. They are such as are frequently found with different degrees of frequency in phthisical patients. It would be unnecessary then to recur to them here. In several of these patients, for example, we have found some bronchial branches perceptibly dilated; in a very great number the parietes of these tubes appeared to be considerably thickened. Ulcerations of the mucous membrane are common enough in the bronchi which carry air to the pulmonary lobes most filled with tubercles.* We once observed a rather singular arrangement of these ulcerations. It was in an individual, one of whose lungs contained much more tubercles than the other. The half of the trachea on the side of the lung most diseased was perforated with ulcerations through its entire extent; the other half scarcely presented any. The inner surface of the principal bronchial branches on the same side presented but one single ulceration, in the midst of which there were seen scattered — 1st. Species of reddish fungous growths, the remains (*debris*) of the mucous membrane; 2dly, portions of cartilages, which, like ridges, were detached from the bronchial parietes.

SECTION II.

DISEASES OF THE PULMONARY PARENCHYMA.

90. The alterations presented by the portions of pulmonary parenchyma which surround tubercles, are very frequent, and often more distressing than the tuberculous affection itself.

* According to M. Louis, these several changes observed in the mucous membrane, the larynx, the trachea, depend more or less on the passage of the sputa, and to this opinion he is led by the circumstance that it is the posterior parts of these organs that are always affected. In this opinion he was anticipated by M. Broussais, in his *Histoire des Phlegmasies Chroniques*, tom. ii., where he says, in speaking of the frequency of laryngeal and tracheal inflammation in phthisis — Je n'en ai pas etudié les causes determinantes d'une manière bien particulière; mais on presume assez que les particules âcres et fetides qui s'elevent des foyers purulents doivent en faciliter efficacement l'action. — Trans.

"The close connexion of these lesions with phthisis is established by the fact that Louis found ulceration of the epiglottis and larynx in *one-fifth*, and ulceration of the trachea in *one-third* of the cases which he examined; whereas he found it once only in one hundred and twenty-two patients who died of other chronic diseases. The same accurate pathologist discovered that these ulcerations occur more frequently in men than in women in the proportion of two to one." — (Dr. James Clarke's Treatise on Consumption.) — Trans.

We already mentioned (Chap. II.) that pulmonary tubercles recognise for their commencement in some cases an acute inflammation of the parenchyma, indicated by the ordinary symptoms of pleuro-pneumonia. This inflammation may disappear, and it may happen that in the dead body no other traces are found but the tubercles themselves. At other times, the pneumonia, instead of being resolved, passes into the chronic state, or else it is chronic from its commencement. It is in the midst of the portions of pulmonary parenchyma, in this state of chronic inflammation, that tubercles frequently appear to have had their origin. What seems to prove that in this case their development did not precede the pneumonia, is this, that they are found very small in size and very few in number, scattered in the midst of a vast extent of hepatised lung. Frequently, for instance, we have found but two, three, or four, small miliary tubercles in one entire indurated lobe; they seem then to be developed in the midst of this, as they are produced at the bottom of ulcerations of the mucous membranes, within false membranes, etc.

But if observation proves that in a certain number of cases pneumonia precedes tubercles, and is even the occasional cause of them; observation also tells us that much more commonly tubercles are developed with previous pneumonia discoverable by us during life, and that the latter supervenes at a later period only as a complication. In fact, in the greater number of phthisical patients, the invasion of tubercles is accompanied only by the symptoms of simple bronchitis; the sound of the thoracic parietes is retained in its normal state; the respiratory murmur is not altered. We do not mean to say, however, that, in the very point where each tubercle is formed, this formation has not been preceded and occasioned by a process of congestion or irritation more or less analogous to that which constitutes pneumonia. We have already dwelt on this kind of pneumonia, which is exactly limited to the point where the tubercle is to be developed. The autopsy proves its existence, and may even prove in more than one case that it has preceded the formation of the tubercles; but how are we to recognise it during life?

The pneumonia, less circumscribed and recognisable by the symptoms which presents itself as an intercurrent affection during the course of pulmonary phthisis, may be acute or chronic. In the acute state it is remarkable for the frequency of its returns. It is not uncommon to see phthisical patients, who, during the progress of their disease, have had well-marked symptoms of pneumonia, up to twelve or fifteen times. This intercurrent inflammation is often easily recognised; thus the sputa suddenly change character, they become rusty, viscid, and transparent; care should be taken not to confound them with simple hemoptysis; in the latter, the blood expectorated is not intimately mixed with mucus, as in the sputa of pneumonia. At the same time the dyspnœa perceptibly increases; fever becomes more intense and continued: auscultation and percussion may yield the different signs by which pneumonia is usually indicated.

But it is not always thus easy to diagnose an acute inflammation developed around or in the vicinity of pulmonary tubercles. The expectoration, for instance, may not change character, it may remain that which appertains either to chronic bronchitis, or to a tuberculous excavation. The previous existence of different rales having their site either in the bronchi, or in the tuberculous excavations, may entirely annul the information afforded by auscultation, with respect to the invasion of an inflammation of the parenchyma; it may also happen that percussion is no longer useful in consequence of the coincidence of an old pulmonary hepatisation, or of a collection of tubercles. In fine, the dyspnœa itself may not perceptibly increase; and even when the difficulty of the respiration should become greater, that would not suffice to characterise pneumonia, since many different causes may produce a similar increase of the dyspnœa.

The intercurrent pneumonia of phthisical patients, too often overlooked and neglected, causes the premature death of a great number of these patients; at other times it does not bring on their immediate death, but, even in this case, it is always mischievous, inasmuch as it favours the development of the tubercles and hastens their softening. More than once have we seen patients in whom the pulmonary phthisis had for a considerable time proceeded but very slowly; an attack of pneumonia supervened and disappeared after having run through its usual periods; but from that time the process of pulmonary *tuberculisation* took on an astonishing degree of activity, not only on the side where the acute inflammation had existed, but also, what was very remarkable, in the opposite lung, and in a very short space of time immense caverns were formed.

The chronic pneumonia of phthisical patients, whether it may, or may not have succeeded an acute inflammation, or whether it may have preceded or followed the development of tubercles, does not occasion such immediate danger as acute pneumonia; but it produces results oftentimes more distressing than those depending on the tubercles; it occasions particular symptoms, which it is important to distinguish from those which are connected with tubercles; further, it gives rise to different alterations of the lung, whose nature does not appear to us to have been duly appreciated up to the present time.

The only signs, which, during life, can indicate the existence of chronic pneumonia complicating tubercles, are those afforded by percussion and auscultation. Still it must be noticed, that if there be but simple chronic engorgement of the pulmonary parenchyma, percussion is scarcely of any use, and auscultation itself can, in our opinion, afford but very doubtful signs. That crepitous rale, which, according to Laennec, should then be heard, does not seem to us so characteristic, that, becoming confounded by imperceptible shades with the mucous rale, it may not also be met with in simple bronchitis.* When there is, on the contrary, pulmonary hepatisation, the sound of the thoracic parietes becomes dull, and this dulness is most frequently observed in the points corresponding to the summit of the lung: it is there, in fact, that the greatest number of tubercles exist, and that they most frequently become complicated with pneumonia. At the same time auscultation affords different signs, which vary according as the tubercles are still crude in the midst of the indurated pulmonary parenchyma, or already changed into caverns. In the former case there is either total absence of every species of respiratory murmur and of rale, or else different varieties of rale are heard, which have their site in the bronchi, (the sibilous, the snoring (*ronflant*) rales, the mucous rale with large or small bullæ, and even the crepitous rale,) or else these different sounds give place to the phenomenon of *bronchial respiration*. Then the resonance of the voice may be such as to simulate pectoriloquy more or less perfectly. In the second case, however small in extent the caverns may be, auscultation gives no information regarding the state of the parenchyma around them; only the great evidence of pectoriloquy may incline us to suspect that the cavern is surrounded by an indurated parenchyma.

The sputa can no longer afford us any light here, since in the case where the pneumonia is chronic, they are never other than those of simple bronchitis. With respect to the dyspnœa, it would appear, *à priori*, that it should be, in this case, greater than when the tubercles are surrounded by a tissue still pervious to air, and yet observation has convinced us that, in the majority of circumstances, the breathing was not perceptibly more embarrassed in the one case than in the other. It seems that then a sort of supplementary respiration is

* In the preceding part of this volume, we endeavoured to prove that the *crepitous* and *mucous* rales are but simple varieties of one and the same sound, which, with respect to each, takes place in the greater or less ramifications of the bronchial tree.

established in the portions of the lung which have remained pervious to the air. At the very time we are writing this article, there is in the wards of M. Lerminier a man sixty-four years of age, who, without the help of auscultation and percussion, might seem to be affected only with mere chronic pulmonary catarrh. In fact, he has had a cough for a considerable time, and expectorates a considerable quantity of puriform mucus every day, which is often divided into round patches, which float on a turbid serum. In other respects he has no fever, the breathing does not appear embarrassed, speech free and natural, voice strong, can lie in any position, has considerable embonpoint, face has a good complexion, and his muscular strength is proportioned to his age. But if the thorax be percussed, in the space included between the right clavicle and breast of the same side, we discover a very dull sound, and in this same extent the natural murmur of the pulmonary expansions is replaced by the phenomenon of bronchial respiration, mixed at intervals with some mucous rale. There is no doubt from these signs that this old man is affected with chronic inflammation of the upper lobe of the right lung; we consider even as very probable, from other observations, the existence of a certain number of tuberculous granulations in the midst of the portion of the indurated lung; and yet the breathing is not more embarrassed than in persons affected with simple chronic bronchitis; the function of nutrition is not perceptibly changed.

Considered with respect to its anatomical characters, the chronic inflammation which prevails around pulmonary tubercles presents several varieties. There may be simple engorgement of the parenchyma, which then presents different shades of redness. Most frequently, the pulmonary tissue is indurated, and this induration may exist with red, grey, or black colouring: we shall speak only of this latter, of its causes and its nature.

The black induration of the lung has been considered as the result of the infiltration of its tissue by a matter of new production, by *melanosis*. This matter, it is said, is united or combined, molecule by molecule, with the very tissue of the organ. We can understand how this may happen in a certain number of cases; we can understand that the colouring matter which constitutes melanosis may be arranged and solidified in each of the meshes or areolæ of the parenchyma, whence will result the appearance of hardening of this latter, in the same manner as it may form a solid deposition in a circumscribed point, and constitute there a melanic mass or concretion. But we think it easily proved that in the greater number of cases of induration of an organ, which is at the same time coloured black, it is independent of this black colour, and is the mere result of chronic inflammation. Such is particularly the case of black induration of the lung (phthisis with melanosis). Accordingly we find this same induration of the pulmonary parenchyma will all possible colours, red, light grey, deep grey, slate colour. In certain cases we may follow in one and the same lung the insensible transition from the grey tint to the deepest slate colour; and, where the latter does not exist, the pulmonary parenchyma is not less hard. We must then necessarily conclude that the state of hardening of the lung with black colouring does not essentially differ from this same state of hardening with whitish or greyish colouring. In this latter case we do not hesitate to refer the pulmonary induration to simple chronic inflammation: why not make the black induration also depend on it? A mere shade of colour is certainly not sufficient to warrant one in considering as different two states, which in other respects are entirely similar, whether with regard to their other anatomical characters, or in reference to the symptoms which indicated them during life, or, in fine, with regard to the causes which gave rise to them. Thus then we must either consider the phthisis with melanosis of Bayle, as a mere variety of chronic pneumonia, or still further increase the number of phthises and refer to them the white, grey, and yellow induration of the pulmonary parenchyma, as so many distinct species.

If the preceding considerations lead us to admit that black induration of the lung is nothing else than chronic pneumonia, with the addition of a colouring matter, we may conceive cases where the latter may form without the tissue, where it originated, being previously indurated; this is what the authors, who considered the induration as appertaining to the presence of the melanosis, could not admit. Laennec has also carefully separated from it this simple black colour, which is often observed in the lungs, in the form of lines and patches, without the ordinary consistence of these organs being in any respect changed. But if it is proved that the induration of the lung is not the product of melanosis, there can no longer be any reason for establishing a distinction between the black colouring, which accompanies certain pulmonary indurations, and that which exists without induration, and of which Laennec has made a separate class, under the name of *black pulmonary matter*. There are cases where, in the midst of a pulmonary parenchyma which is generally sound, there are found scattered some black and hard masses, which, at first sight, seem foreign to the tissue of the lung; but isolate a lobule in which one of these masses exists, without cutting or tearing it, and you will see this indurated lobule, either partially or entirely, present several shades of colouring, greyish in several points, brownish in others, and altogether black, where before this examination you had recognised nothing but the existence of a melanic mass: then the latter will present to you its real appearance; it will no longer appear any thing but a portion of the pulmonary tissue, chronically inflamed and coloured black, as the neighbouring portions, equally indurated, are coloured red, grey, or brown.

The black induration of the lung has been observed at all ages of life. I have seen it through the entire of the upper lobe of the left lung in a girl nine years old. I have often found it at the La Charité in persons not thirty years old. However, it is right to mention that it is principally in old persons that chronic pneumonia is most frequently accompanied with black colouring, as if the disposition to the formation of tubercles, which is very marked in youth, was replaced at a later period by the disposition to the secretion of melanic matter. It is also a remarkable circumstance that, when the latter is very abundant, and when at the same time the lung contains tubercles, these, in a certain number of cases, seem to have a tendency to heal, or at least their development seems arrested; this seems to be indicated, as we shall hereafter see, by their cretaceous appearance, and their tendency to be changed into stony concretions.

In the 33d case of his work on phthisis, Bayle speaks of a lung which, after having been cut into, presented an appearance a little similar to that of certain granites. It consisted, says the author, of a vast number of round granulations, of a black slate colour, and the size of a pea, connected by a substance which was softer, but of the same colour. Bayle considers this case as an instance of granular phthisis with melanosis. But in these black granulations we can see nothing but portions of lobules, which, consecutively to chronic inflammation, become indurated and blackened. Observe that Bayle clearly states that around the granulations the pulmonary parenchyma was softer, a circumstance which completely accords with what we have said regarding the state of the pulmonary parenchyma around the granulations, when we strove to ascertain their nature. (Chap. I.) This softer parenchyma, adds Bayle, was also coloured black. That which was called melanosis in the granulations, should then, according to Laennec, have been called pulmonary black matter. But no, it is always the same secretion, the same deposition of colouring matter; only the tissue where this secretion takes place has in several points undergone a change of consistence, and the form of granulation is the result of these partial indurations.

If we follow the same colouring in other tissues, we shall first find some where it is the result of a normal secretion. This is what happens, both in man, with respect to the choroid membrane and bronchial ganglions, and espe-

cially in certain animals, where the black colour is diffused naturally through several tissues, and in particular through the tegumentary membranes internal or external. As a morbid production we find a much greater number of instances of it in man himself; thus the gastro-intestinal mucous membrane when in a state of chronic inflammation, the false membranes of the peritoneum, the arterial ulcerations around their edges or within them, the portions of cellular tissue which form the parietes of fistulæ or abscesses, frequently present a black colour more or less deep. It is in these same circumstances that the pulmonary parenchyma becomes indurated and blackened. This unusual colouring may result, either from a mere change which the blood undergoes by its continued stagnation in the tissues,* or probably from the secretion of a particular colouring matter, which is produced in the several tissues just mentioned under the influence of an inflammatory process, as it is formed naturally in the choroid. The lung, more than any other organ, when affected with chronic inflammation, has a peculiar tendency to acquire the black colour; this then takes hold of the parietes of the pulmonary vesicles, or, if you will, of the parenchyma of the lobules, as in consequence of the mere progress of age, and independently of all previous inflammation, it has a tendency to form in the interlobular spaces. But it seems to me that in the lung at least the sole existence of this black colour cannot constitute a particular accidental tissue, as Laennec laid it down, when he designated the black induration of the pulmonary parenchyma by the name of melanosis. The phthisis with melanosis of Bayle seems to us nothing else than mere chronic pneumonia, having for its anatomical character the usual hepatisation together with a black colour. The symptoms assigned by Bayle to this species are, moreover, precisely the same as those appertaining to every induration of the pulmonary parenchyma. It is rather unusual to find no tubercle in a lung affected with black induration. Bayle has given but three cases of it in his work. The identity of the symptoms of pulmonary melanosis and of chronic pneumonia, in other words, of black induration of the lung, and of its red or grey induration, we have frequently observed.

SECTION III.

DISEASES OF THE PLEURA.

91. The pleura presents different alterations in phthisical patients, more often even then the pulmonary parenchyma. The greater part of these alterations are the result of an acute or chronic inflammation.

In almost all cases where the lung contains tubercles, intimate adhesions unite the pleuræ costalis and pulmonalis to a greater or less extent. These adhesions correspond in general with the number of the tubercles; they are more considerable when the pulmonary parenchyma around them is indurated. They are principally found in those points corresponding to the parts of the lung where the tubercles are collected in the greatest quantity. In some cases where the lung, healthy in other parts, presented but one simple mass of tubercles united in one part, near the periphery of the organ, we found the pleura free from adhesion every where except where the tuberculous mass existed.

Sometimes no adhesions are found, and the pleura costalis alone seems to have been altered. It is then found thickened in separate patches, which correspond

* The experiments of Hunter and of other physiologists have proved that the blood whose circulation is retarded or suspended in a part, assumes there a blackish tint more and more deep, whether it still be contained in the vessels, or has become stagnant outside of them.

to collections of tubercles, or rather this thickening depends on a secretion of coagulable lymph, which occurred on one or other of the surfaces of the pleura. We have sometimes found these partial thickenings of the pleura pulmonalis, whether real or apparent, of a deep black colour. Then the circumference of the lung was studded with black patches which rose several lines above the level of the surface of the organ, thus seeming to constitute real melanic tumours. But in several of them it was easy to perceive their real nature; in fact, they were not all uniformly black; a considerable number of them presented a white or greyish tint, and in this state they seemed to be nothing but an accumulation of false membranes on the free surface of the pleura, or more frequently still, a perceptible thickening of the very fine but very vascular cellular tissue uniting the pleura to the lung. In other places these greyish patches were partially coloured a light brown tint, which in others gradually increased in intensity and extent. It became evident then that the black tumours were but those same white patches with the addition of a black colouring matter, but that they should no more be considered here as a peculiar tissue than in the lung, where we have already considered their formation and their nature.

We have sometimes found, in one or more points of the pleura pulmonalis, a sort of puckering of this membrane with whitish thickening of its tissue. This puckering we thought remarkable, as it coincided with the existence of a cretaceous tubercle situated on the surface. The entire presented the following arrangement: in some one point of the circumference of the lung there was observed a circumscribed induration, from which, as from a centre, there arose several radiating lines appertaining to the pleura, which in this place seemed as it were to have been folded. On making an incision into the central induration, it was found to be formed by a tubercle not large in size, of cretaceous consistence, which was surrounded to the extent of some lines by a black and hard tissue. Does not this fact seem to confirm the idea already expressed, namely, that cretaceous tubercles are those which, by the absorption of their more liquid parts, have diminished in size, and have a tendency to heal? How, in fact, are we to account for that species of puckering, or radiated folding of the pleura, otherwise than by supposing that this membrane, having been previously raised by a large tubercle, was then as it were dragged and brought back towards the point where the tubercle existed, according as the latter lessened in size? Does not the skin present an almost similar puckering, when the tissues subjacent to it, and to which it has become more adherent than usual, have suffered any loss of substance?

92. Tubercles are often enough developed in phthisical patients amidst the false membranes of the pleura; in them also all inflammations of serous membranes have a remarkable tendency to become complicated with the formation of tubercles. Thus, for instanae, we lately opened the body of a young man whose lungs contained tubercles, and who also presented to us a considerable quantity of them in false membranes of the pericardium, pleura, and peritoneum. We do not remember to have seen tubercles produced simultaneously in these different serous membranes, without the lungs also containing some. It is necessary to be understood with respect to what we mean by tubercles in serous membranes. They are studded with a great number of whitish granulations, which resemble pulmonary tubercles only in their rounded form; these granulations seem to be nothing but rudiments of false membranes, depositions of coagulable and organisable matter on the free surface of the membrane. Such granulations exist in many persons who are not phthisical. But in those who have a predisposition to tuberculisation, these granulations, by increasing in size, seem to take on another nature; they become like clots of curdled milk, whether they remain separate, or by uniting constitute masses of greater or less size; occasionally some are found as if depositions between the laminæ of false

membranes. To what are these variable appearances to be attributed? They depend, no doubt, on the modifications occasioned by individual predisposition in the morbid secretion of the serous membrane.

In this way the many kinds of pus are explained which may form in the middle of an abscess. In one person, for instance, it will be laudable pus, as it is called; in another it will be the pus called scrofulous, more or less resembling tuberculous matter. We cannot refuse to acknowledge it as a general fact, and to lay it down as a sort of law, that there are persons in whom every congestion, irritation, or inflammation, in a word, every unusual process of nutrition, tends to terminate in the secretion of the particular and well-marked matter which constitutes tubercles. It also appears that for the very reason that this matter is already formed in one point of the system, that is a reason why it is more easily produced elsewhere. In an individual whom we had an opportunity of examining, and who had tubercles in the serous membranes of the thorax and abdomen, the pia mater, infiltrated with serum, was also studded, on the convexity of the hemispheres, with small round whitish clots, consisting of a sort of concrete pus, which differed very little from tuberculous matter properly so called. In a preceding portion of this work, we have spoken of another patient, whose arm was for a long time the seat of vast depositions of pus, which had their commencement in an abscess in the axilla, and in whom one might really trace the gradual change of the pus into apparently tuberculous matter. Thus then the more we advance, the more we see facts multiply, which should incline us to consider tubercles as a mere form of morbid secretion.

Instead of acquiring the properties which constitute them tuberculous matter, if I may so say, the granulations of the pleura may, without enlarging, assume a harder consistence, and ultimately become stony. We saw this in a woman, who died of encysted dropsy of the ovary. The free surface of each pleura pulmonalis was in a manner roughened with small rounded granulations, of a stony consistence, similar to grains of sand. The pleura presented no other trace of inflammation; the parenchyma of the two lungs was perfectly sound.

In all the cases where we have found tubercles in the pleura, whether secreted on the free surface of the serous membrane, or deposited between pre-existing false membranes, we met them in the lungs; most commonly they exist there in great numbers, and the tuberculous affection of the lung is then the principal disease. Once only have we seen the reverse: considerable tuberculous masses existed not only in one of the pleuræ, but in other organs also, whilst the lungs scarcely contained any tubercles; and again the latter existed only on the side opposite to that where the pleura presented them — we shall give an account of this case.

Case 12. — Numerous tubercles developed in the pleura and in several other organs, the lung containing but very few, and only on one side.

A woman, thirty-five years of age, was in a state of great emaciation, when she entered the La Charité, in the November of 1825. She complained of having a cough for a long time; she had never spit blood; respiration not much impeded; the expectoration purely catarrhal. Auscultation detected some dry or moist bronchial rale in different points, but no sign indicating the existence of pulmonary caverns, and the existence of tubercles could only be suspected. The abdomen was at the same time swollen and painful; percussion discovered evident fluctuation in it; there were alternations of diarrhœa and of constipation. However, the patient became more and more debilitated, the diarrhœa became permanent, and she died in the beginning of December.

Post-mortem. Immediately behind the sternum, the intercostal muscles and

cartilages of the ribs, considerable masses of tuberculous matter existed, resting on the pericardium and filling the anterior mediastinum. All the left lung was encompassed from its summit to its base by a thick layer of a yellowish white matter which was friable and tuberculous, as was that which filled the mediastinum; in some points this layer was more than a finger's breadth in thickness; it existed between the pleuræ costalis and pulmonalis; a considerable mass of this same matter was interposed between the diaphragm and the left lung. This latter, carefully examined, seemed healthy and exempt from tubercles through its entire extent. The right lung, on the contrary, whose serous envelope presented no other alteration than some cellular adhesions of small extent, contained towards its summit a small tuberculous mass of the size of a nut. In the remainder of its extent were observed small bodies of a dull white colour, being at the utmost the size of a grain of millet, which seemed to be commencing tubercles. Between them, as also around the tuberculous mass in the summit, the pulmonary parenchyma was perfectly healthy.

A considerable quantity of serum was effused into the cavity of the peritoneum; the latter membrane was studded by a considerable number of granulations of a yellowish white colour, and friable. They were real tubercles. Between the proper tissue of the spleen and its fibro-serous envelope, a thick layer of tuberculous matter was interposed, similar to that which filled the left pleura. The parenchyma also of the spleen was studded with small round and whitish bodies, similar to those in the right lung. Lastly, in the substance also of the uterus, very near its cavity, or rather between its proper tissue and the membrane lining the parietes of this cavity, a friable mass of tuberculous matter was deposited about the size of a large nut. Nothing remarkable existed in the other organs.

93. The different alterations now described are formed gradually, according as the pulmonary tubercles become developed and multiplied. This production is especially indicated by those pains, fixed or moveable, transient or permanent, of which the thoracic parietes are so often the seat in phthisical patients, and which are not accompanied by any serious symptom. In several of these patients the pains now in question are so rare and fugitive, that they do not complain of them; in others they are more severe; then they may render lying on the side where they occur impossible; they are very painfully felt, both during each inspiratory movement, as also during every attempt to cough. Ordinarily of but short duration we have seen them sometimes continue for several months in succession in the same state. They are most frequently felt where, after death, adhesions are most usually found. They are, for instance, common enough in the dorsal region between the scapulæ, or beneath either of the clavicles.

The close adhesions which, in phthisical patients, so often unite to a greater or less extent the pleura costalis and pleura pulmonalis, account for the rarity of pleuritic effusions in these same patients; these effusions can actually take place only where there are as yet no adhesions; also when they do exist they are usually partial; they do not rise, for instance, above the level of the lower lobe of either lung; sometimes, again, they are seen to form in the pleura corresponding to the lung which contains the least tubercles. The formation of a pleuritic effusion, whether single or double, in phthisical patients, is always accompanied by serious consequences; by this effusion the portions of lung which had still remained pervious to air become compressed, and are consequently rendered useless; the breathing becomes more and more embarrassed, and speedy death is the result of this fatal complication. We refer to another part of this work with respect to the nature of the signs which may announce it.

94. It is almost exclusively in persons affected with pulmonary tubercles

that we find the cavity of the pleuræ filled with elastic fluids. Nothing, in fact, is more uncommon than idiopathic pneumothorax, that is, a pneumothorax produced by gaseous exhalation from the pleura. In all the cases of pneumothorax which we have had an opportunity of seeing, the existence of a gas in the cavity of the pleura was the result of the existence of a pulmonary fistula, which established a free communication between the interior of the pleura and a tuberculous excavation, into which some bronchial tubes opened. The most common situation of these fistulæ is towards the summit of the lung, where caverns are most frequently met; being often very small, concealed by the lung, surrounded by adhesions, they are not found without some difficulty. We have seen that, in some cases, where the intestines presented but a solitary small ulceration, this ulceration gained in depth, and occasioned a perforation of the intestinal parietes, a perforation which did not take place in other circumstances where the digestive mucous membrane resembled, as it were, a sieve, in consequence of numerous and vast ulcerations. We have also seen cases in which the lung contained but a single excavation scarcely large enough to admit a nut; this excavation, situate immediately beneath the pleura, and constituting a part of its parietes, had caused its inflammation, and subsequently its laceration, the result of which was the formation of a pneumothorax. Sometimes solid adhesions, thick false membranes, form as it were a barrier which prevents a cavern which has perforated the pleura from pouring liquids or gases into the cavity of this membrane.

The elastic fluids which the pleura contains in the cases now in question must then be nothing else but atmospheric air conveyed into the bronchial tubes which open into the tuberculous excavations.* It appears, however, that this atmospheric air once effused into the pleura, may undergo considerable modifications there with respect to its composition. When it is mixed with pus, which is the most common case, its purity is altered by the production of hydro-sulphuric acid gas in a quantity sufficient for the sense of smell to recognise its presence. We very lately had an opportunity of ascertaining this. In England, Mr. Davy found that gas found in the pleura, and which came, as here, from pulmonary caverns, contained a quantity of carbonic acid much greater than that which ordinarily exists in atmospheric air.†

With respect to the very marked symptoms which announce in phthisical patients the complication of pneumothorax, whether alone or combined with an effusion of liquid, we shall say more in another place (*Diseases of the Pleura*).

SECTION IV.

DISEASES OF THE BRONCHIAL GANGLIONS.

95. The tuberculous degenerescence of these ganglions in phthisical adults is

* Laennec considered that the elastic fluids contained in the pleura in these cases, were the product of the decomposition of some portion of the effused albuminous and puriform matter. Modern pathologists, however, doubt whether such is ever the source of pneumothorax. "It may be laid down as proved," says Dr. Houghton, "that where pneumothorax exists the air has been introduced from without; for cases of an opposite description are so rare that they must be considered as exceptions to the rule." (Cycloped. of Pract. Med., vol. iii., p. 452, in which article may be found some interesting and valuable observations on the nature of this affection.) — TRANS.

† The composition of the air found in the sac of the pleura has also been chemically examined by Dr. Apjohn, Professor of Chemistry to the Royal College of Surgeons in Ireland. (Dub. Trans. of Coll. of Physicians.) According to his analysis, one hundred parts of it consisted of eight parts of carbonic acid, ten parts of oxygen, and eighty-two of nitrogen." — TRANS.

rather uncommon; in children, on the contrary, it is much more common: which corresponds with what is observed regarding the other lymphatic glands of the body. Thus, for instance, in childhood most of the cases of chronic enteritis occasion engorgement of the glands of the mesentery, the case is no longer the same after the period of puberty; then consecutively to the intestinal affection, the glands of the mesentery become tumefied, but without being *tuberculated* in the majority of cases; this may be observed, for instance, in phthisical patients whose intestines have been for a long time the seat of numerous ulcerations.

Before puberty it is not uncommon to find the tuberculous affection much more considerable in the bronchial ganglions than in the pulmonary parenchyma. We have seen, for example, the posterior mediastinum filled with enormous masses of these ganglions, which surrounded, like beads, the trachea and its divisions, whilst in the lung we find only some miliary tubercles surrounded by a healthy tissue; but it should not be forgotten that at the same time the mucous membrane of the air-passages presented traces of inflammation more or less intense. In some cases the ganglions alone seemed to be tuberculous; the lung presented no appearance of accidental production; the bronchi were red.

In the adult we have also ascertained the different relations established between the morbid state of the bronchial ganglions on the one hand, and that of the respiratory apparatus on the other. Thus in him we have also observed —

1st. A perceptible tuberculous degenerescence of the bronchial ganglions coinciding with numerous pulmonary tubercles.

2dly. A similar state of the ganglions, with very few tubercles in the lung.

3dly. Lastly, some tubercles in these same ganglions, without a trace of pulmonary phthisis.

In this latter case we have most frequently met marks of inflammation in the air-tubes. If the upper part of the latter is the part most affected, then it is no longer in the interior of the thorax; it is in the cervical region, around the larynx and trachea, that the lymphatic glands are developed and have a tendency to become tuberculated. They are then sometimes placed between the posterior part of the trachea and œsophagus, and separate these two tubes from one another; by their becoming more and more developed they may compress the œsophagus and impede deglutition.

Finally, we have ascertained the existence of the tubercular state of the bronchial ganglions in some individuals who, during their stay in the hospital, had presented no symptom of pulmonary catarrh, and in whom the inner surface of the air-passages presented after death no trace of inflammation either ancient or recent. If, in this case, a previous bronchitis had produced the tubercular state of the ganglions, why did it not give rise to the development of tubercles in the lung? Will it be said that the predisposition to the formation of tubercles existed only in the bronchial ganglions and not in the pulmonary parenchyma?

96. In some cases we have found real suppuration in these ganglions. From their black and tumefied tissue there flowed, either by simple incision or by pressure, a purulent liquid similar to that which flows from a slice of lung in the third stage of inflammation. The tissue of the gland was at the same time softened; it was reduced to a pulp under the finger. At other times it was compressed, and perhaps destroyed by the pus which was collected into an abscess. We have met this real ganglionitis, which terminated in suppuration, only four times; and it is remarkable enough that, in three of these cases, there was merely chronic bronchitis, not at all of a severe character (it was in individuals labouring under heart disease), and, in the fourth case, the parenchyma of one of the lungs, which was in the second stage of inflammation in a part of

its extent, presented towards its apex two or three very small cavities with smooth, and, as it were, cellular parietes, filled with a purulent liquid not at all resembling softened tubercle, and which was, on the contrary, altogether identical with the pus contained in the bronchial ganglions. It is one of the rare cases in which, we think, we have best detected the existence of pulmonary abscesses. There was also in this lung another cavity scarcely large enough to hold a small pea, surrounded for the space of some lines by a hard and black tissue filled with a cretaceous substance. Lastly, in the midst of the small engorged portions of perenchyma, there existed greyish bodies scattered in different parts (the granulations of Bayle, partial induration of the pulmonary lobules), and, again, in the midst of these granulations, or beside them, very small, rounded, and, as it were, molecular masses of a whitish matter (nascent tuberculous masses).

Our mode of considering the production of tuberculous matter squares very well with the preceding facts. We should have been much more surprised to find pus formed in the ganglions, and not tubercles, if the latter had at the same time existed in great quantity in the lung; for the same disposition which favoured the secretion of tubercle in the latter should have produced it, then, instead of pus, in the ganglions, as in all other inflamed points. But observe, such was not the case in four individuals in whom we found a ganglionitis with suppuration: in the three first there was no trace of tubercle either in the lung or elsewhere; in the fourth, to be sure, some vestiges of it were found, but they were of such a nature that some indicated a process of tuberculisation, which was no longer in activity, if I may so say (cretaceous tubercle, etc,), while the others indicated another process which was as yet but in the incipient stage. It does not, then, seem to us unreasonable to suppose, that if the ganglionitis had taken place some years before, it would have terminated in tuberculisation; and that, on the other hand, if the patient's life had been prolonged, and the rudimentary tubercles found in small numbers in the lung had had time to become developed, the pus secreted by the inflamed ganglions would have become tuberculous matter: it would have been the same with respect to the pus collected in small abscesses in the apex of the lung.

97. Are tubercles of the bronchial ganglions announced by symptoms sufficiently characteristic to render it possible to establish their diagnosis? We do not think so; and this is one of those affections which cannot be discovered except by *post-mortem* examination. There are some cases, however, where one might be inclined to suspect their existence. Such, for instance, is the following: —

Case 13. — Symptoms of chronic bronchitis — Considerable dyspnœa, with greater debility of the respiratory murmur on the left than on the right.

A farrier, thirty-eight years old, had enjoyed good health up to the month of February, 1824. At this time he began to cough, and up to the month of May, when he entered the La Charité, his cold still continued; his voice became hoarse and his breathing was short; he never spit blood. When we first examined him, we found the chest equally sonorous in every part; the respiratory murmur was loud and distinct over all the right side; *on the left, on the contrary, it was everywhere perceptibly weaker*, but in other respects natural. The only thing of which the patient complained was being constantly out of breath, a feeling which was considerably augmented, not only by walking on an inclined or horizontal plane, but even by the sligtest motion in the bed. The dyspnœa also became considerable after each meal. The manner of lying down was quite indifferent. The cough was slight, and the expectoration catarrhal. There was no morbid symptom with regard to the heart or large vessels. Slight feverish attacks took place from time to time; the face was

pale, and nutrition perceptibly altered. The following days the patient spit blood at different times; we several times ascertained the existence of some fever; the habitual dyspnœa became from time to time much greater. What was the cause of this great embarrassment of the respiration and of the other morbid phenomena? The continuance of the cough, the hemoptysis which recently supervened, the attacks of fever which appeared from time to time, and, lastly, the emaciation, were cogent reasons to make us dread the existence of tubercles scattered through the substance of the lung. But the suffocation was much greater than that ordinarily occasioned by tubercles, and, besides, these could scarcely account for the greater weakness of the respiratory murmur on the left than on the right; for unless miliary tubercles are sufficiently numerous to constitute a single mass by their aggregation, or else, unless the pulmonary parenchyma between them be hepatised (and then the sound would have been dull), the respiratory murmur, far from being weaker, increases in intensity. Proceeding by the method of exclusion, we were led to consider that the principal bronchus of the left side was compressed by a tumour, owing, probably, to a tuberculous mass of bronchial ganglions. Thence the introduction of a less quantity of air into the left lung, and consequently the great dyspnœa. This patient left the hospital, after remaining a month, without his state being perceptibly changed.

98. Tubercles of the bronchial ganglions may, as those of the lung, take on a more or less rapid course, remain stationary, or even tend to a cure, either by the absorption of a part of their elements, the result of which is a diminution in their size, or by their evacuation, after they have become softened. When speaking of cretaceous tubercles of the lung, we laid down the reasons which rendered it probable to us that several of them had been at first ordinary tubercles, which, at the same time that their size was diminished, had changed their physical properties. We think the same thing happens also in the case of several tubercles of the bronchial ganglions. More than once we have found them consisting of cretaceous, and even stony substances, formed by molecules separated in a manner from each other. One would say that the connexion which had previously held them together had been removed by absorption. Around them we sometimes saw a cellulo-fibrous cyst, and once even a bony one: the gland itself, consisting of a black and hard tissue, appeared withered and wrinkled, as if it had been larger in size.

In several cases where the glands and the tubercles which they contained were in the state just described, the lungs also contained cretaceous tubercles with fibrous or cartilaginous cysts, and black induration of the pulmonary parenchyma around them. We shall make a remark here which probably is not unimportant: it is not peculiarly in old persons that we have found masses similar to chalk or plaster in the bronchial ganglions; we have met them in nearly equal frequency in middle-aged persons, from thirty-six to fifty years of age.

We have found them more rarely in persons below thirty; however, we must not omit to mention that one of the most remarkable instances of cretaceous tuberculisation of the bronchial ganglions, with apparent withering of the latter, was presented to us by a young woman, twenty-three years old, who died of an acute gastro-enteritis during the winter of 1824. The lungs contained towards their summit some small masses, as if consisting of lime, and moreover a considerable number of miliary granulations were scattered through different points of their parenchyma.

In a preceding part of this work we have spoken of the cure of the tuberculous matter of the bronchial ganglions by evacuation. We then saw how these tubercles, on contact with the parietes of the trachea or bronchi resulting from their bifurcation, might occasion inflammation of them, and in consequence per-

forating ulceration. The tuberculous matter formed in the ganglion empties itself through this artificial opening and is expectorated. Thus the tuberculous affection of the bronchial glands may be cured, if, however, consequently on this salutary evacuation, the process of tuberculisation is arrested, which unfortunately is very rare. Of what use can this cure be if there be at the same time pulmonary tubercles, which is the most common case? Still we may conceive a case in which a communication, set up by nature between a diseased ganglion and the trachea or bronchi, should be considered as very advantageous; that is, when there is simple ganglionitis, after which the gland is transformed into a single and immense purulent focus, of which we have already given instances. In this case, when once the pus is evacuated through the air-passages, it has no longer any tendency to be reproduced as tuberculous matter has; the cavity which it has left behind must become effaced, and at the same time the cicatrisation of the tracheal fistula must take place, as being no longer kept up by the presence of the foreign body, as we may consider the pus to be which flowed from the ganglion.*

Case 14.—Tubercles of the bronchial ganglions—Lungs healthy—Chronic peritonitis.

A boy, fifteen years of age, had always enjoyed tolerably good health; he was, however, liable to catch cold, oftentimes had diarrhœa and frequent epis-

* "The symptoms which indicate the presence of tuberculous disease in the bronchial glands are generally for some time obscure; hence these organs may be tuberculous to a considerable extent without this being detected, as it is not until they acquire a considerable size, and irritate the bronchi mechanically, that the local symptoms become evident. The child coughs, and is very liable to catarrh, and occasionally it points to the upper part of the chest as the seat of irritation. But the same symptoms may be produced by common catarrh or pulmonary tubercles to an equal degree. When the diseased state of these glands is further advanced, the nature of the case is more easily detected. When there is cough, hectic fever, and emaciation in a child, and when a careful examination neither discovers tuberculous disease in the lungs, nor in the mesenteric glands, we may feel tolerably certain of its existence in the bronchial glands. In some cases these glands are so much enlarged, as to fill up a great portion of the posterior mediastinum, and even to produce a swelling by the side of the trachea, which is visible externally; but this is rare. If the child is old enough to expectorate, and tuberculous matter is brought up, while we can discover no cavity in the lungs, the diagnosis is almost certain.

"Tuberculous disease, however, does not, in general, remain long isolated in the bronchial glands; other organs, especially the lungs, become tuberculous, and the symptoms are then of course complicated. Still there are some cases in which the disease proves fatal while confined to these glands. . . . . It is not quite a matter of indifference whether the seat of the tuberculous disease be the bronchial glands or the lungs. In the former situation the progress of the disease is slower, continuing in some cases for years, during which the little patient may enjoy pretty good health. The disease being seated in organs much less essential to life than the lungs, interferes less with the general functions of health, and gives time for the application of remedies which its situation in the lungs does not allow. In this respect it resembles a similar affection of the external glands, and like it also is susceptible of cure.

"The termination of this disease is various. That the tuberculous state of the bronchial glands may be removed by absorption, as we see occur in the lymphatic glands of the neck, we have every reason to believe; but this is probably the less frequent termination. Another mode of cure is that by which the softened tuberculous gland empties itself into the bronchial tube with which it is in contact, by ulcerative absorption of the walls of the tube, as is shown in Dr. Carswell's beautiful plates. The matter being evacuated, the cavity in which it was contained gradually contracts till it is obliterated; and the cure, as far as this gland is concerned, is complete. The less frequent cure is that in which a portion of the gland, or rather of the tuberculous matter, remains in a cretaceous form. The prognosis of this form of phthisis must always be doubtful, inasmuch as it depends on a circumstance which we are unable to ascertain, namely, the extent to which the bronchial glands are diseased, and on the complications which so often accompany this affection. The prognosis, however, will be more favourable than when the disease exists in the lungs." (Dr. Clark in the Cyclopædia of Practical Medicine.) — Trans.

taxis. During the months of April and May, he had regularly every night a febrile attack, which commenced with shivering and terminated by a profuse sweat. During this time the attacks of epistaxis were frequent, and eight days did not elapse without the patient having diarrhœa. At the commencement of the month of June, the febrile accessions became more unfrequent and erratic, but at this period also the abdomen became the seat of abdominal pains, at first intermittent, then continued, and which became more severe every evening. They were not perceptibly increased by pressure; they were mitigated after alvine evacuations. The patient had from five to six stools in twenty-four hours. These pains continued to the end of the month of June: no active treatment was opposed to them; the patient continued to take his usual food; the diarrhœa became permanent; by degrees the pain ceased, but the abdomen began to become tumefied; in the course of the month of July it was of an enormous size; the parts around the ankles also became œdematous. Up to this period the patient kept his bed only temporarily; he entered the La Charité towards the end of July.

His face and limbs were then very much emaciated. Fluctuation of the abdomen evident; it was also considerably swollen; the cellular tissue of the lower part of each lung was infiltrated with a little serum. Strong pressure on the abdomen occasioned no pain. The larynx was a little red towards the summit; great thirst; appetite nearly gone; ten watery stools, without colicky pains, took place in twenty-four hours. The breathing was embarrassed, arising probably from pressure on the diaphragm. Slight frequency of the pulse, without heat of skin. Urine scanty; cough without expectoration; the chest, when percussed, sounded well in every part; the air appeared to enter the lungs freely. Pulsations of the heart natural.

From this collection of symptoms, the ascites seemed to us to have been the product of a slowly developed inflammation of the peritoneum.

The patient took a diuretic mixture, and his thighs were rubbed night and morning with an ounce of the tincture of digitalis.

During the month of August he became still weaker, without presenting any other change; profuse diarrhœa continued till death; about fifteen or twenty hours before he expired, the abdomen became diminished in size, and this sudden absorption of the serum we looked on as a signal of approaching death.

Post-mortem twenty hours after death. Marasmus very great; belly diminished in size; slight œdema around the ankles.

Nothing remarkable in the brain.

Heart and lungs perfectly healthy; tuberculous degenerescence of the bronchial glands, which were united together like beads at the root of each lung.

In the abdomen we found about two glasses of perfectly limpid serum.

The intestines were connected together into one single mass by false membranes, which were reduced for the most part into cellular tissue. No tubercle found in this part.

The digestive tube, which was opened through its entire extent, was remarkably pale in every part except in the cæcum, where three or four red patches were observed.

This case presents a rare instance of the existence of tuberculous matter in the bronchial ganglions, the pulmonary parenchyma being entirely free from them; nor was this affection marked by any symptom which could excite suspicion of its presence. The obstinacy of the cough was, on the contrary, a motive for thinking that the pulmonary tissue was tuberculated.

ARTICLE II.

DISEASES WHICH COMPLICATE PULMONARY TUBERCLES, AND WHICH HAVE THEIR SEAT WITHOUT THE RESPIRATORY ORGANS.

SECTION I.

DISEASES OF THE HEART AND ITS APPENDAGES.

Among these diseases some are a common complication of phthisis, and form an essential part of its history; others are observed only in a manner accidentally, and we shall refer to them only as far as they shall present some rare cases of pathological anatomy or of symptomatology.

In about one-third of the persons who die of pulmonary phthisis, the heart is found to be in its normal state; in the other two-thirds it is changed, but sometimes this change consists in a real or apparent increase in its size; sometimes it is smaller than natural, whilst its parietes are perceptibly increased in thickness (internal hypertrophy); sometimes, in fine, the heart is really atrophied, that is, its size is smaller than natural, and its parietes are attenuated.

100. The increase in the heart's size most frequently consists in dilatation of the right cavities, with or without hypertrophy of their parietes. It seems to depend on the obstacle which the blood experiences in freely traversing the vascular apparatus of the lung, which is frequently obliterated to a certain extent, as we have already endeavoured to show. It is thus that a too narrow aorta seems to have been sometimes the cause of certain hypertrophies of the left ventricle. When aneurism of the right side of the heart exists in only a slight degree, it is announced during life by symptoms not very marked, and its existence may be recognised by auscultation. When this aneurism is more considerable, more striking symptoms render its diagnosis easy; we should not, however, forget to observe that, in a certain number of phthisical patients, the great extent of the heart's pulsations does not indicate a morbid state of this organ, but that it results solely from the induration which the pulmonary parenchyma has undergone. It is by this latter circumstance that we can often explain why the pulsations of the heart have been heard with force under either clavicle, or even in the back, in persons whose heart was found to be healthy after death.

Some authors have considered the infiltration of the lower extremities, observed in several phthisical patients, as a symptom depending on the presence of tubercles in the lung; some makes this infiltration to depend on mere debility, whilst others refer to the embarrassment of the pulmonary circulation; our own observation has led us to the following conclusion: in phthisical patients, in whom the right cavities of the heart are neither hypertrophied nor dilated, in whom the aortic orifice is free, and in whom also there exists no mechanical obstacle to the venous circulation in any other point, the subcutaneous cellular tissue, and particularly that of the lower extremities, constantly remains very dry; a little œdema around the ankles is the only trace of infiltration observed, and even this partial œdema is very rare. In the phthisical patients, on the contrary, whose lower extremities are infiltrated to a degree however inconsiderable, whether this infiltration extends or not to the rest of the subcutaneous or intermuscular cellular tissue, as well as to the different serous membranes, we find, in the majority of cases, as the cause of the dropsy, an organic disease of the heart, or some other obstacle to the venous circulation, such as obliteration of some venous trunk, affection of the liver, etc.

The puffiness of the face, the purple colour of the lips, the inability to lie in the horizontal position, are likewise so many symptoms which often coincide with pulmonary phthisis, but which do not depend on it; they announce an aneurismatic state of the central organ of the circulation.* In several phthisical patients, for instance, we have observed such suffocation, that they were obliged to remain continually sitting up in bed; others, in order to breathe more freely, and to lessen the state of anxiety which oppressed them, spent the night sittin in a chair; every time we observed these symptoms, the existence of a disease of the heart, and in particular of a dilatation of its right cavities, accounted for the phenomena. We agree, however, that this state is most frequently consecutive on the pulmonary affection; but what seems to us very evident is that the phenomena now mentioned are not produced as long as the lung alone is diseased.

101. The internal hypertrophy of the left ventricle, with diminution of the size of the heart, does not occasion any peculiar phenomena in phthisical patients; the same may be said of the real atrophy which this organ undergoes in other phthisical patients. This atrophy, viewed with respect to its cause, is very easily accounted for: it is, in fact, natural to suppose that the heart participates in the diminution of size, which the muscles of animal life undergo in so striking a manner in pulmonary phthisis; this is the necessary consequence of the incomplete hematosis which must take place — which must occur, when the lungs, more or less seriously disorganised, cease to admit the air into a part of their vesicles. It would be important to know why, in four individuals, whose respiratory apparatus seems placed in the same circumstances, in the one the heart does not deviate from its normal state; in the second it is hypertrophied and dilated either in its entire extent, or in one of its cavities; in the third it presents mere increase of nutrition in the parietes of the left ventricle, with diminution of its cavity; and finally, in the fourth it undergoes real hypertrophy.

SECTION II.

DISEASES OF THE DIGESTIVE TUBE.

102. Of all the organs the digestive tube is certainly that which, next to the lungs, presents in phthisical patients the most common lesions, and those most important to be well understood. Can we account for this almost constant coincidence of pulmonary tubercles with different alterations of the gastro-intestinal mucous membrane? Probably we might here make application of the law in virtue of which the affection of a tissue tends rather to be reproduced in the other parts of the same tissue than in other points of the system. Thus, in the acute state, in the diseases called continued fevers, the inflammation, congestion, or irritation which exists in the gastro-intestinal mucous membrane, usually extends to the air-passages, whether limiting itself to the great bronchial ramifications it constitutes a simple catarrh, or attacking the pulmonary vesicles, it is changed into a pneumonia. In the chronic state we may again observe this same simultaneous existence of disease; we may see a chronic inflammation of the bronchi and intestines either alternate, or exist at one and at the same time, in the same individual. Most of the patients who, before presenting evident signs of pulmonary tubercles, have had frequent catarrhs, have been also subject to frequent diarrhœas. Now it is satisfactorily proved that the latter are then but the mere result of an enteritis or colitis more or less severe. Is not this again one of those

* We give the name of aneurism only to those diseases of the heart where there is an increase in the size of this organ.

facts which might be adduced to prove that, in the lung as in the intestine, tubercles are developed and appear only consecutively to the irritation of the mucous membrane, an irritation which, according to the predisposition of the individuals, require different degrees of intensity and duration to produce tubercles ?

The alterations of the digestive tube in phthisical patients are particularly remarkable in the infra-diaphragmatic portion of this tube : we shall study them, 1st, in the stomach ; 2dly, in the small and large intestines.

103. The frequency of the affections of the stomach may be proved in phthisical patients both by the examination of the symptoms, and by the autopsy.

The result of our own observations is, that in at least three-fifths of the persons who died of phthisis in the La Charité, in the wards of M. Lerminier, we found after death a well-marked morbid state of the stomach.

This viscus presented in phthisical patients the following lesions : —

1st. In some cases, considerable injection of the mucous membrane, most frequently existing towards the great cul-de-sac, without perceptible change of consistence or thickness, or any appreciable alteration of the subjacent tissues. This injection, which had its seat exclusively in the capillary system of the gastric mucous membrane, without the veins of a larger calibre which pass over the subjacent cellular tissue having been gorged with blood, could not be confounded with a mere mechanical injection, the result of impeded circulation ; it was a real inflammatory injection. This injection was either arborescent or dotted, or sufficiently intense to constitute by the aggregation of a great quantity of capillaries filled with blood red patches more or less extensive.

2dly. In other cases the mucous membrane was no longer red ; but it presented a brown or slate-coloured grey tint ; at the same time it retained its ordinary thickness, and usual consistence, or else it was thickened and indurated.

3dly. At other times, and much more frequently, we have found this same membrane softened in different degrees, whether it was at the same time red, or whilst being softened, and reduced to a pulp, it still presented a more or less perfect whiteness.

4thly. We have but rarely found in phthisical patients ulcerations of the mucous membrane of the stomach.

5thly. We have seldom detected in them the existence of any change in the tissues subjacent to the mucous membrane. Sometimes, however, the laminated (*lamineuse*) membrane appeared indurated, the muscular membrane hypertrophied, and in two cases only out of several hundred, we have seen the gastric mucous membrane raised by tubercles. In these two particular cases, there were around these tubercles unquestionable traces of inflammation : redness and puffiness of the mucous membrane in one case, ulceration of this membrane in the other.

6thly. There are causes where the parietes of the stomach of phthisical patients exhibited extreme attenuation, without their presenting any of the ordinary anatomical characters of inflammation. The inner surface of the stomach was remarkably pale. The mucous membrane appeared in the form of a very thin pellicle ; the fleshy tunic itself consisted only of some fine, colourless fibres, which appeared confounded with the cellular tissue interposed between the mucous membrane and the peritoneum. Sometimes the attenuation of the different fibres was such, that in several points the parietes of the stomach seemed to be formed merely of the peritoneum, which appeared to be separated solely by a very fine cellular web from the matters taken into the stomach. In this state of attenuation the parietes of the stomach were sometimes so soft that they were

torn by the slightest efforts ; at other times they presented sufficient resistance and seemed much less softened than in other cases where these same parietes had not diminished in thickness in so remarkable a manner. This proves that the attenuation of the gastric parietes and their softening are two phenomena, which, though often united, may, however, exist, independently of each other.

Among these different lesions which the stomach of phthisical patients presents, there are some which we think cannot be referred to inflammation, or irritation ; there are others, in the nature of which medical men are not agreed, but which, according to us, should be referred to an inflammatory state. Finally, there are several of these lesions which are considered, by unanimous consent, as the result of inflammation.

We shall not dwell on these last, since there can be no dispute with respect to them. Among those of the second class is found the red or white softening of the gastric mucous membrane. Is this softening, in a great number of cases, a sign of an inflammatory state of the stomach ? To prove that gastritis is a common affection in phthisical patients, it is necessary that the question just proposed should be answered in the affirmative ; for softening of the gastric mucous membrane, is in these patients the most common lesion presented by the stomach. We shall not then be wandering from our subject in devoting some pages to the solution of this question, which has been left undecided by M. Louis, in his excellent essay on softening of the mucous membrane of the stomach. But first let us observe that three principal degrees may be admitted in this softening; namely, a first degree, in which the membrane, though having lost its natural consistence, being no longer capable of being detached in shreds, and being reduced to a pulp by slight scraping, retains, however, a solid form before being scraped. In the second degree we find over a certain extent of the stomach, in place of the mucous membrane, only a sort of white, grey, or reddish pulp, which might be taken for mere mucus laid over the cellular tunic. Finally, in a third degree, this sort of pulp or semi-liquid substance, which took the place of the mucous membrane, has disappeared, and the submucous cellular tissue is exposed, either in some detached points only, or over a vast extent. One of the most remarkable examples which we have had an opportunity of observing is the following.

Case 15.—Almost complete destruction of the entire mucous membrane of the stomach in a phthisical patient.

A man, thirty-five years of age, died of phthisis in the hospital. During the three months which he passed in the hospital, he never vomited ; but he constantly complained of a total failure of his appetite, an habitual sense of constriction toward the epigastrium, which was changed into a real pain when any simple food or even simple drinks were introduced into the stomach : drinking wine produced nausea, and in particular a marked *burning* sensation, which, commencing from the cardiac orifice, extended in the course of the œsophagus as far as the upper part of the pharynx. At the *post-mortem*, the mucous membrane of the stomach was found in the form of mere debris. From the cardia to the pylorus the submucous cellular tissue was laid bare, having retained its natural whiteness, and appearing only a little thickened. In some points, however, there were still perceived some remains of the mucous membrane, which were recognised by the reddish white tint, and by the slight projection of the detached patches. Tubercles were also found in the lungs, and ulcerations in the intestine.

104. The inflammatory nature of a great many softenings of the gastric mucous membrane may be proved by the examination of the anatomical cha-

racters of these softenings, of the symptoms which they occasion, of the causes which often give rise to them, and of the treatment most successfully opposed to them.

105. The anatomical characters prove to us, that in the majority of cases where the gastric mucous membrane is softened, this softening is accompanied by other changes which indicate a state of inflammation. Thus, most frequently, the softened mucous membrane presents a red colour, either uniformly spread over its surface, or scattered in the form of mere points, patches, or spots of variable extent. Over the submucous cellular tissue veins pass evidently dilated, as if varicose, such as they are found where a more or less inveterate inflammatory process exists, as, for instance, around old cutaneous ulcers, as around cancerous degenerescences of the breasts, etc. It would, however, be contrary to observation to admit that this as it were varicose state of the submucous veins of the stomach is in all cases the index of an inflammatory state. Oftentimes have we found a similar dilatation of the veins on the inner surface of the skin, and particularly of the hairy scalp. These veins, distended with black blood, presented an appearance precisely similar to that of the gastric veins now mentioned. Now it was very evident that this dilatation of the subcutaneous veins could not be referred to inflammation, and that it arose solely from the mechanical stagnation of the blood in the venous system. But the one of these phenomena does not exclude the other, and we may conceive that, according to the cases, the venous dilatation may depend either on inflammation,* or on passive congestion.

If we trace this same softening through other organs, whether membranous or parenchymatous, we shall find it connected most frequently with other anatomical characters of inflammation.† Thus the inflamed cellular tissue, at the same time that it is red and filled with pus, becomes soft and friable. M. Dupuytren long since remarked the great friability acquired by the cellular tunic of arteries when attacked with inflammation. Serous tissues when inflamed also become very friable. Examine the cutaneous tissue where a pustule of small-pox exists ; you will often find it, either merely at its surface, or through its entire substance, so softened, that at this part the skin gives way and is lacerated by the slightest effort. After inflammations of the synovial membranes, either acute, or more especially chronic, who has not observed the ligaments and other fibrous parts surrounding the joint, deprived of their usual consistence, and ultimately constituting a mere pulp? In these same inflammations the cartilages themselves also sometimes present a pulpy softening, the result of which sooner or later is their complete destruction, or a denuded state of the bone. Brought into contact with pus, the periosteum is at first thickened, then softened and destroyed. The softening of the transparent cornea is observed after intense inflammation of the conjunctiva. In parenchymatous tissues one of the first effects of inflammation is also to diminish their cohesion in a perceptible manner. Thus we can now no longer doubt that softening of the brain is the result of encephalitis, at least, in the great majority of cases ; thus certain degrees of inflammation of the pulmonary parenchyma are marked by such a diminution of its consistence, that this parenchyma may be scraped and reduced to a pulp by the slightest pressure; thus in some cases, where during life the nature of the symptoms induced us to suspect the existence of hepatitis,

* Not only may dilatation of the veins supervene consecutively to inflammation of the parts from which they convey blood, but it may even result directly from an inflammation of their own parietes. Such is the opinion lately expressed by M. Ribes. In an excellent *Article on Phlebitis* (Révue Médicale, July, 1825,) he expresses himself thus: *Sometimes the vein, slightly inflamed, becomes dilated and distended with blood.*

† M. Lallemand may justly claim the merit of having pointed out the influence which inflammation exercises over the softening of organs.

we have found after death the tissue of the liver remarkable for its extreme softness.

But there are cases in which, at the same time that the gastric mucous membrane is softened, it retains its usual whiteness, so that from mere inspection one might suppose that it was perfectly healthy. Should this white softening of the stomach also be considered as a result of inflammation? Here the question becomes more delicate. It should be remarked, however, that in several parts we cannot deny the existence of inflammation, though these parts may not be red. Such is the case of the serous membranes which secrete pus, and which, however, most frequently retain their natural colour; they do not become red, but they are softened. It will not be denied, no doubt, that the induration of the cellular tissue around old ulcers is an inflammatory product. And the cellular tissue, thus indurated, often presents a perfectly white appearance. The softening of the transparent cornea, succeeding an acute chronic ophthalmia, is often neither preceded nor followed by redness. It does not appear, then, that we can argue from the mere whiteness of certain softenings of the gastric mucous membrane to prove that these softenings are not a result of inflammation. We cannot arrive at this negative conclusion but by bringing together several kinds of proofs.

From these facts it follows, that directing our attention merely to the lights afforded by anatomy, we should consider the softening of the mucous membrane of the stomach as connected with a state of inflammation. Let us see whether the examination of the symptoms will lead us to the same conclusion.

106. First, there is a certain number of cases in which the symptoms observed in an individual whose gastric mucous membrane is found softened after death, evidently annonnced an inflammation of the stomach, a circumstance which takes place particularly when the disease has been acute. When, on the contrary, it has assumed but a chronic course, two cases may present themselves:—1st. There may still be observed symptoms, more or less marked, connected with the stomach, such as pain of the epigastrium, increased by taking in meat and drink, vomiting more or less frequent, etc. Now these symptoms are precisely those which are observed in cases where the autopsy discovers unquestionable traces of gastritis, such as thickening, puffiness, vegetations, ulcerations of the mucous membrane. 2dly. One may find this same membrane considerably softened, though during life there may have been observed but very obscure signs of gastritis. Thus the patients do not vomit; they even retain considerable appetite; they have no pain; their thirst is not increased, the circulation is not disturbed; they merely complain of more or less painful digestion, and waste away. But it is not only in the cases of simple softening of the mucous membrane that this absence of symptoms is observed: this membrane may be the seat of extensive ulcerations, of large fungous tumours, of the most varied degenerescences, without its remarkable lesions being announced by any other symptoms than those a little before mentioned, namely, laborious digestion, without any other local symptom, and a general alteration of nutrition properly so called. It must then either be admitted that these different lesions are sometimes the result of an inflammation, and sometimes do not depend on it, or acknowledge that the softening of the gastric mucous membrane is not less an inflammation, though it exists almost without symptoms. Now, of these two propositions the second is the only one admissible. We shall acknowledge, then, that there may exist cases of gastritis, with softening of the mucous membrane, without any marked symptom, in the same way as there exist cases of pneumonia without dyspnœa and without any rusty sputa, pleuritis, or peritonitis without pain, etc.

Thus, attention to the symptoms, as well as to the anatomical characters, tends to prove that softening of the gastric mucous membrane is the result of an inflammatory process.

107. If we now consider the nature of the causes which in a great many cases have acted in producing this softening, we shall see that these causes enter the class of irritants. Thus, in animals, the introduction of corrosive or acrid poisons into the stomach frequently occasions softening of the mucous membrane of this organ. We have found this softening carried to a high degree, extended to all the tunics of the stomach, which were torn, and reduced to a pulp by very slight force, in an infant to which, several months before, sulphuret of potass had been given. Since the administration of this substance it had had vomiting, and had fallen into a state of marasmus. We have often had the opportunity of opening, at the La Charité, the bodies of persons who had been addicted to ardent spirits, and one of the most frequent lesions which their stomach presented was red or white softening of the mucous membrane. The *jelly-like* softening, as it is called, of the stomach, so well described by M. Cruveilhier, came on, according to the account of this learned observer, in children who were weaned, and *gorged* with coarse indigestible food. It is evident that, in this way, the irritable stomach of these children was placed in the condition most favourable for the development of gastric inflammation. In the other organs we may also see softening produced under the influence of manifest causes of irritation. Thus, after blows or falls on the cranium, the brain becomes inflamed ; *it is softened.* Thus, when foreign bodies are introduced and remain in the midst of a parenchyma, when accidental tissues are developed in it, this parenchyma, irritated by their presence, becomes inflamed around them ; *it is softened.* This, for example, is frequently observed in the brain of children around tubercles.

To be sure, many softenings of the stomach or of other organs occur without any cause of irritation appearing to concur in their production. But if these softenings present the same anatomical characters, and the same symptoms as those developed in consequence of a manifest irritating cause, must we not hence conclude that the first are of the same nature as the second ? Would we be warranted in admitting an inflammatory arachnitis, and an arachnitis not inflammatory, because in one case the inflammation is developed under the influence of an evident cause of irritation, such as a *coup de soleil*, etc., whilst in the second no cause of this kind seems to have acted ?

Again, it has been objected that a considerable number of softenings of the stomach, or of the brain, are produced, either in persons advanced in years, or in individuals who, plunged into a greater or less state of debility, appear placed in conditions not favourable to the development of inflammatory affections. But, thanks to the progress of pathological anatomy, we now know that inflammation equally manifests itself in young or old, robust or debilitated persons. Only in these different conditions the local inflammation announces itself by another set of general symptoms. Thus, for instance, in a young plethoric irritable individual of great nervous susceptibility, a very circumscribed softening of the gastric mucous membrane will be capable of producing intense general reaction ; whence violent fever, delirium, convulsions, total interruption of all the functions, and speedy death. In other individuals, placed in opposite conditions, this softening may arise and extend without producing any other symptom than slight disturbance of the digestive functions ; and whilst in the former the disease will be fatal in the space of a few days, in the second, on the contrary, it will be from its origin essentially chronic, and may continue for several years. It is in this way also we may explain why softening of the brain presents itself in general with the predominance of spasmodic movements in the young man, and of simple paralysis in the old man.

Shall we now endeavour to determine the nature of the softening of the gastric mucous membrane from the mode of action of the different therapeutic agents ? We shall find that tonics or stimulants applied to a softened membrane

aggravate the case, and often render temporarily manifest a gastritis which till then was announced only by very obscure symptoms. On the contrary, the antiphlogistic system appears most suitable.

Thus, to sum up, the anatomical characters of softening of the mucous membrane of the stomach, the symptoms which mark its existence, the causes under whose influence we often see it developed, the mode of treatment by which it is most successfully combated, all concur in demonstrating the inflammatory nature of this softening.

From all that precedes we shall deduce then this important consequence, namely, that more than half the phthisical patients, of those at least who die in hospitals, are at the same time affected with inflammation of the stomach. This inflammation presents perceptible varieties with respect to its symptoms, its progress, the dangers which it may threaten, or the influence which it may exercise on the principal disease. Let us consider these varieties.

108. The gastritis which accompanies pulmonary phthisis, may present itself in an acute or chronic form. The second form is more frequently observed than the first.

109. There are some cases of pulmonary phthisis whose commencement is marked by an acute inflammation of the stomach. In the midst of the most perfect state of health, individuals feel a pain in the epigastrium more or less severe; they have nausea, vomiting; their tongue is red and dry: they are devoured by a burning thirst; at the same time they cough, and present the symptoms of simple bronchitis, which seems to engage the attention much less than the inflammation of the stomach. But at the end of a longer or shorter time, and when the symptoms of the gastritis are already perceptibly amended, the cough continues; hemoptysis supervenes; dyspnœa manifests itself; and, finally, everything announces a tuberculated state of the lungs.

Among the cases of this kind which have come under our observation, we shall always remember that of an individual who entered the hospital with all the symptoms of a well-marked gastro-intestinal inflammation. He was strong, plethoric, and never had had in his life any other affection except some slight colds. Fifteen days after his admission, the abdominal symptoms had in a great measure disappeared, but the patient had a very severe cough, resembling that which appears at the commencement of measles. No fever; breathing free. The respiratory murmur was heard distinct, except in several points, where it was obscured by some bronchial rale. Some days later a profuse hemoptysis appeared, and continued for about forty-eight hours; from that time rapid emaciation came on; six weeks after his admission caverns were manifest in the summit of the lung; and, at the end of two months, death in the last stage of phthisis. Tubercular cavities were found in the lungs, and also the gastric mucous membrane was red and reduced to a pulp towards the great cul-de-sac. (The appetite had never returned; the epigastrium always remained sensible to pressure.) In this case, what at first was but a secondary affection became the principal disease: the inflammation of the stomach was mitigated, but did not leave the patient; the bronchitis, on the contrary, became worse; and here no one will refuse to admit that it was the very origin (*point de depart*) of the development of the tubercles, unless persons prefer to suppose that these tubercles, till then latent, by reason of their crudity and small number, began to multiply and soften a little time after the attack of gastritis. But even on this latter hypothesis these tubercles manifested their presence only subsequently to the inflammation of the stomach. Few cases of phthisis are observed to assume so acute a course as that now referred to.

110. In the above cases the gastritis preceded the attack of phthisis; it was probably the primary cause of it by the sympathetic irritation which it exercised on the lung. Let us now turn our attention to other cases in which tubercles having already manifested their existence in the pulmonary parenchyma, but

the phthisis being as yet only in the first stage, an acute inflammation of the stomach was subsequently developed. Let us consider these symptoms, and note particularly the influence which it may exercise on the affection of the lung.

During the first period of phthisis, it sometimes happens that the tongue is red and dry; at the same time the appetite is lost, the taking of food gives rise to a painful sensation in the epigastrium; the fever, either none, or but inconsiderable till then, becomes continued and intense. The cause of this new group of morbid phenomena appears such as should be referred to a state of acute irritation of the stomach; but this cause may be readily overlooked, because, on the one hand, the local symptoms are often but little marked, and on the other hand, at the same time that the stomach is inflamed, we most usually perceive the affection of the lung become evidently aggravated; the cough becomes more frequent and more painful; the sputa were tinged with blood; the oppression is increased. The gastritis seems to exercise in this case a sympathetic irritation on the lung. We find here, moreover, the particular application of a general law, in virtue of which, every time that an inflammation manifests itself in an individual in whom an organ is already diseased, it is principally on the latter that the sympathies are exercised, unless a revulsion can be brought about by the new inflammation which is set up. Now, I possess no fact which proves that this kind of revulsion has been sometimes produced by an acute gastritis coming on during the first period of pulmonary phthisis. At a more advanced period, on the contrary, as we shall presently see, this revulsion is not very uncommon; there are patients in whom we can very well appreciate the sympathetic influence which the development of a gastritis exercises on the symptoms and progress of commencing phthisis.

A young girl had retained, after a profuse spitting of blood, a dry cough and a little oppression; she gradually lost flesh; she had no fever, had still some appetite, and attended to her usual occupations. There was reason for dreading in her case the existence of pulmonary tubercles, but nothing afforded any certainty of them. One day this patient felt a pain in the epigastrium; she was attacked with vomiting; the tongue became red; fever was lighted up. The second day of the attack of this gastritis the cough became more intense, and the patient, very much oppressed, spit a considerable quantity of blood. Under the influence of proper treatment the symptoms of gastritis disappeared, and at the same time that they improved the hemoptysis ceased, the cough became lighter, and the patient returned to the same state in which she was before the attack of gastritis. Two months after the latter again reappeared, accompanied by the same symptoms; a little time after the hemoptysis again manifested itself. The gastritis again terminated favourably, and with it the spitting of blood was observed to disappear, the pulmonary tubercles again seemed to remain stationary. Lastly, at the end of some months, new symptoms of inflammation of the stomach developed themselves for the third time, and, as before, the spitting of blood reappeared with marked exacerbation of all the symptoms of the thoracic affection. The gastritis promptly disappeared; but this time the symptoms appertaining to the chest, far from improving, became more and more severe, and the patient was soon brought to the last stage of pulmonary consumption, and died.

From these facts we shall draw the conclusion that acute gastritis which supervenes, as a complication, in the first period of pulmonary phthisis, may exercise the most mischievous influence in the progress of the latter; an active treatment is then necessary, and it is by powerful antiphlogistics, that we must combat, from their commencement, those intercurrent inflammations, however mild the symptoms may otherwise seem to be. It is in cases of this kind, that we have seen the application of leeches to the epigastrium, put an end to profuse

hemoptysis more certainly and more promptly than venesection could have done.

111. In the other stages of phthisis, from that where tubercles (as yet but few in number) begin to be softened, to that wherein vast cavities are formed in the pulmonary parenchyma, acute inflammation of the stomach becomes a more frequent complication than in the first stage. It is announced by the same symptoms, and most frequently also it produces a marked exasperation in the symptoms of phthisis. However, this exasperation does not always take place, and in this respect one might range in three classes those phthisical patients who, at a more advanced stage of their disease, are attacked with acute gastritis. In some this gastritis appears to exercise no influence on the pulmonary affections; in others, as we have just said, it exasperates it in a very striking manner. It may, for instance, impress a really acute character on a case of phthisis which, till then, progressed but very slowly. Thence the necessity of not confining ourselves to an expectant mode of treatment, and of meeting this gastric inflammation by antiphlogistics, though it may affect individuals already labouring under a chronic disease. Finally, in other phthisical patients, at the same time that the stomach is inflamed, the primary disease seems to retrograde; the cough becomes rarer; the sputa are less copious, and of a less unfavourable appearance; the breathing itself seems freer; the colliquative sweats are suspended, or at least diminished. It would seem that in this latter case, a real revulsion takes place of the lungs on the stomach. Thus in several phthisical patients, we perceive the diarrhœa and the expectoration alternate in a very striking manner, so that the latter becomes more profuse when the former ceases, and *vice versâ*. I have observed this diminution of the symptoms of phthisis after an attack of gastritis, only when the latter was sufficiently intense to cause the patient's death. The acute inflammation of the stomach is in fact the cause of the premature death of a certain number of phthisical patients.

112. But acute gastritis, though occurring in phthisical patients more frequently than was for a long time thought, is still much less common in them than chronic gastritis. The latter may succeed an acute inflammation, but it is more frequently chronic from its commencement. Uncommon in the first stage of phthisis, it is principally when there is softening of tubercles or formation of cavities that it is seen to appear. This affection is marked in a certain number of cases by signs sufficiently characteristic readily to establish its diagnosis; but at other times it is announced by symptoms so little marked that it may be readily overlooked. Let us consider these different shades.

The first phenomenon which oftentimes in phthisical patients reveals the existence of chronic gastritis, is a remarkable susceptibility of the stomach. As long as such patients do not exceed the strict regimen which is prescribed to them, nothing indicates an irritation of the stomach in them: they digest tolerably well the little food that is allowed them; but should they eat either a great quantity of food, or such as is of a more irritating quality, their stomachic digestion becomes painful and laborious. The introduction of a few spoonsful of wine into the stomach is followed by a sensation of heat, or of real pain in the epigastric region; the tongue becomes red; vomiting supervenes. These same symptoms are reproduced, if, for the simple demulcent ptisans hitherto employed, there be substituted bitter drinks, such as the different preparations of lichen or quinquina. Again, diminish the quantity of food, cease the use of wine, suppress the employment of bitters, the gastric symptoms disappear. In cases of this kind, where nothing else was observed with respect to the stomach than this mere susceptibility which was aroused by every kind of irritant, I found the gastric mucous membrane in a state of evident inflammation (red dotted co-

louring, with marked softening). Thus, then, in phthisical patients, we shall not always consider as a nervous phenomenon, that great sensibility of the stomach; apprised of its real cause, we shall employ but rarely, and very cautiously, the different tonic and antispasmodic substances, so unsparingly used for a long time; it is particularly by an antiphlogistic treatment we shall endeavour to combat it.

In other phthisical patients, it is no longer in an intermittent form, and when the stomach has been accidentally stimulated, as in the case referred to, that the disturbance of the functions of this organ manifests itself; we often observe the most complete dislike for every species of food, so that an invincible loathing prevents the patients from taking any nourishment; that is the only morbid phenomenon which indicates a lesion of the stomach. But if any irritating substance be administered, then symptoms of gastritis appear, the epigastrium becomes painful, vomiting takes place, &c. In a word, after taking an irritant into the stomach, we see the same phenomena manifest themselves as those described in the preceding paragraph; but still further, there is here, during the absence of irritants, a morbid phenomenon very important to be noted, namely, a total, absolute disrelish for every species of food. Is this phenomenon sufficient to indicate the existence of a chronic bronchitis? I think, at least, that if it is not necessarily connected with it, and if it may exist without there really being inflammation, it certainly oftentimes depends on the latter; for, on the one hand, it is oftentimes found connected with great sensibility of the stomach, with an irritability altogether peculiar; whence result manifest symptoms of gastritis, as soon as an irritant is introduced into the stomach; on the other hand, in a great number of phthisical patients who, during life, presented no other morbid phenomena with respect to the stomach, except that total dislike to food now in question, I found unequivocal traces of chronic inflammation of the mucous membrane, most frequently consisting of red, grey, or white softening of this membrane. If, notwithstanding the reasons above adduced, it be objected that this softening is not the result of inflammation, I answer that this total aversion to food has been equally the sole morbid phenomenon which indicated a lesion of the digestive functions in several other patients, in whose stomach ulcerations were found, accompanied with thickening, induration, degenerescence of the mucous membrane around these solutions of continuity. Now, in this latter case, who will question the existence of an inflammation? We must not here confound, with respect to semeiology, the total and permanent dislike to every kind of food, which I here allude to, with the mere diminution of appetite observed in almost all acute or chronic diseases, without, however, there being any inflammation of the stomach. Oftentimes, then, the anorexia seems to depend either on mere disturbance of the nervous system, or on a greater or less alteration of the phenomena of nutrition.

Finally, there are other cases where symptoms less obscure announce, in phthisical patients, the complication of a chronic inflammation of the stomach; and here, again, several degrees must be laid down. Thus in a certain number of patients, besides the complete disgust for food, the introduction of the latter into the stomach will be followed by a sense of weight, of heat, or even of real pain in the epigastrium; pressure will be painful: yet there will not be observed either thirst, vomiting, or redness of the tongue.

In other phthisical patients, where there may be or not, pain in the epigastrium, the tongue which, in the preceding stages, had retained its natural appearance, begins to announce an affection of the stomach; however, it seldom presents, as in the cases of acute gastritis, a red uniform colour, with smoothness of surface. But what it presents more prominently is a tumefaction, a sort of permanent erection of its papillæ; sometimes its edges and apex are of a cherry-red, while the rest of its surface is covered by a whitish layer, more or less

thick; sometimes, in fine, this whitish layer is, as it were, studded with a number of small points of a bright red colour, an arrangement which, in general, seems to me one of the most certain marks of an inflammatory state of the stomach.

Lastly, to the preceding symptoms there is joined great thirst and nausea, which must not be confounded, with respect to its cause, with that which is excited by cough, vomiting more or less copious, consisting either of bile and mucus, or of the drinks, which sometimes are thrown up as soon as they are introduced into the stomach. These latter varieties of chronic gastritis have a tendency to be confounded by their symptoms with acute gastritis.

Several phthisical patients, though presenting undoubted signs of an inflammation of the stomach, state, however, that they still retain some appetite; they earnestly press for food; but I think that, in the great majority of cases, it is but a factitious sensation; these patients are always inclined to attribute the diminution of their strength to the want of food; they confound the feeling of debility which they experience, and which increases incessantly, with the sensation of hunger; but scarcely do they take food, no matter how small a quantity, into their stomach, when a loathing comes on, and in spite of all their efforts they cannot continue to eat, though they feel neither pain in the epigastrium, nor an inclination to vomit, etc., an evident proof that their appetite is not real.

The gastritis which complicates pulmonary phthisis may then, as all other inflammations, present the greatest shades in its symptoms, so that sometimes nothing shall be easier than its diagnosis; and sometimes, on the contrary, more or lessl atent, it will escape the researches of an inattentive or inexperienced observer. But however different the symptoms may be, the lesion will still always be the same, it will always be inflammation. But I think that, in our present state of knowledge, it is not possible to connect such or sŭch a group of the symptoms now pointed out, with such or such a mode of inflammatory lesion of the stomach. Thus, for instance, should the mucous membrane of this organ be softened, indurated, ulcerated, we shall indifferently see the gastritis to be manifest or latent, exist with or without pain, with or without vomiting, etc.

The frequency of gastritis in pulmonary phthisis being well ascertained, we shall thence deduce this important consequence, that it is only with attention and precaution that in the course of phthisis we shall be able to apply substances more or less irritating to the mucous membrane of the stomach. Besides several cases of gastritis in phthisical patients continue, become worse, and in a manner become domiciliated, because very frequently giving rise only to symptoms not at all alarming, they are actually left to themselves in the great majority of cases. — Probably we might diminish the frequency and danger of this fatal complication, if, from its commencement, we opposed to it a more active treatment: applications of leeches to the epigastrium might be very useful to fulfil this indication, as long as the strength of the patient will allow it. If the debility be already extreme, we may have recourse with great advantage to the employment of different topical revulsives also applied over the epigastrium. In such circumstances, I have more than once seen blisters, applied to this region, bring back the appetite, which had been a considerable time lost, or promptly put a stop to obstinate vomiting. On the contrary, I have never seen these symptoms to disappear under the use of substances more or less stimulant when introduced into the stomach. Do we here mean to say, that, in all cases where there is loss of appetite, weight in the epigastrium, nausea, and vomiting, the employment of the latter medicines must be generally prohibited? I do not think so; and I have cited in other parts of this work numerous facts which prove their utility in certain cases. I am satisfied there are morbid states in which tartar emetic, for instance, may remove anorexia, weight in the epigastrium, with much more

certainty than could be done by leeches. Nor am I less satisfied that there are cases of vomiting where bleeding is of no use, and which yield, on the contrary, either to opium, or to different medicines which seem to exercise a specific action on the nervous system. But in pulmonary phthisis the disturbance of the functions of the stomach should, in my opinion, be most frequently referred to an acute, and particularly to a chronic inflammation of this organ, and consequently it should be almost exclusively treated by antiphlogistics. There is a certain number of medicines whose utility in certain stages of pulmonary phthisis is vouched for by experience; such are the different substances called balsamic, several sulphureous waters, different preparations of Iceland moss and Peruvian bark, etc.: but before prescribing these medicines, and during their exhibition, we must carefully inquire into the state of the stomach; for these substances, more or less stimulant, can exercise a favourable influence on the pulmonary disease only as far as the stomach which receives them is entirely exempt from inflammation.

113. Guided by observation, we have laid it down that the functional disturbances of which the stomach of phthisical patients is so often the seat, should be referred, in the great majority of cases, to an inflammation either acute or particularly chronic, of this organ. But because a phenomenon occurs generally in such a manner, we are not strictly warranted in thence concluding that it must always happen so. There is a certain number of cases in which I am strongly inclined to think that some organic alterations of the stomach of phthisical patients are neither the result of inflammation, properly so called, nor even of any process of irritation or of congestion, which, in reality, constitutes but different degrees of one and the same morbid state, which, susceptible of a thousand shades, is connected on the one hand with the physiological state, and on the other hand constitutes the origin of the strangest anomalies of nutrition. To none of these shades do we think we can refer that state of the stomach, which we have already said exists in several phthisical patients, and which, we have said, consists in an extreme attenuation, in real atrophy of the different tissues entering into the composition of the parietes of the stomach. Let us here see, whether it is not the diminished nutrition of an organ, a phenomenon analogous to that which, in these same phthisical patients, takes place in other organs, and particularly in the entire muscular system. This diminution of nutrition may also be readily explained by the deficiency, or, if you will, by the lessened activity of the process of sanguefaction. Might this also explain why inflammation itself, when it occurs in phthisical patients, but rarely gives rise to a considerable hypertrophy of the organs which it has attacked? Be that as it may, it would not appear to us more reasonable to attribute this commencement of atrophy in the organs of phthisical patients to inflammation, or any other similar process, than to refer to it either the constant and regular disappearance of several organs at the term of fœtal life, or the anencephalous or acephalous state, or any other malformation through defect of development. In this latter case, the primary absence of the vessels which should carry the blood to the organ not developed, seems to be one of the causes of the species of arrest which has taken place in its evolution.* In the second case, the organ diminishes in size or disappears, when at a certain period of existence less blood is conveyed to it. Thus it is, also, that the roots of the milk-teeth become atrophied, according as the artery which carried nutrition to them is obliterated. Who does not see great analogy between these different phenomena and those of atrophy of the muscles and other tissues, in persons whose lung, filled with pulmonary tubercles, hepatised, etc., now seems but imperfectly fitted to form blood? Is it not an atrophy of this kind which the transparent cornea underwent in the animals to which M. Magendie allowed for aliment nothing but substances incapable of nourishing

* Serres.

them ?* The adducing of these facts is not devoid of importance at a period when, in consequence of the oftentimes merited favour in which the doctrine of irritation is held, those phenomena are now taken into too secondary account, as, we think, which cannot be rationally explained by the latter.

114. The intestinal canal, properly so called, presents in phthisical patients alterations at least as frequent as the stomach, and which in general have been, up to the present, better appreciated and better described. Here our own observations have been in a great measure merely confirmatory of those of Bayle and other observers. However, among these alterations, there are some which do not seem to us to have sufficiently engaged attention, and on which we shall particularly dwell : there are others, intestinal tubercles, for example, whose nature being still an object of discussion, was capable of being illustrated by new facts.

Among the phthisical patients who died in the wards of M. Lerminier during the last six years, one-fifth, at most, presented a perfectly healthy state of the intestinal canal, from the duodenum to the rectum inclusively. We have elsewhere† mentioned what we understood by this healthy state.

* Precis Elementaire de Physiologie.

† *Clinique Médicale — Maladies de l'Abdomen.* Since the result of these researches was published, new observations made by ourselves, or by others (by M. Billard, of Angers, in particular), have confirmed us still more in the idea that the white colour of the inner surface of the intestines is their healthy state. This opinion is still further confirmed by some researches which we recently undertook on the healthy and morbid anatomy of the intestinal canal of horses. In order to study the healthy state of the intestinal canal in these animals we opened the body of some which had died of accidents, or were killed, because a fracture or other external violence had rendered them unfit for service, whilst they were still full of strength and in good condition. The stomach and intestines of these animals were presented to us under two conditions : in some the process of digestion was in full activity, either in the stomach, or the small intestine ; the others had died at a time when digestion was not going on. From these researches we feel ourselves warranted in drawing the following conclusions :

1st. The natural state of the mucous membrane of the alimentary canal in the horse after death, is a pale colour, as marked and as general as is that of the skin on the human body. Its consistence is considerable ; the villosities are tolerably apparent ; the lacunæ of Sir Everard Home very manifest. With respect to the follicles, they may present in the healthy state very variable degrees of development.

2dly. The process of digestion reddens the portions of the mucous membrane where it is taking place. This redness, which is always slight, approaches nearer to inflammatory redness than certain purely mechanical injections, since it has its site principally in the capillary vessels, and the vessels subjacent to the mucous membrane do not appear injected. It is the villosities in particular which, in the small intestine, appear to receive or retain a greater quantity of blood, than when digestion is not going on. In the cæcum, where it seems that the absorption of some elementary principle still takes place, the presence of the several substances reddens the mucous membrane, as that of the small intestine. In the colon, on the contrary, which seems to be but merely an organ of transmission, the presence of substances no longer produces the same effect, as in the other parts of the canal ; and the redness here must be merely the result of the mechanical irritation occasioned in the colon by the too long sojourn of substances in it.

We have recently had an opportunity of examining the intestinal canal of several persons who, after external violence, passed suddenly, without any intermediate state, from a perfect state of health to death ; the gastro-intestinal mucous membrane was pale through its entire extent. Once, in the case of a young girl twelve years old, who had been crushed near the hospital by the wheel of a coach, the small intestine contained some chyme ; its inner surface was of a rose tint ; the villosities were apparent in the form of small lamellæ of a dull white colour, from the base of which some lymphatic vessels of the same colour were seen to proceed (they were full of chyle). This observation is perfectly analogous to that we made on one of the horses above referred to. If, then, in animals who also died from accidents, in animals subjected to physiological experiments, we find considerable redness in different points of the alimentary canal, we cannot now conclude any thing from this, except that this redness was not the healthy state, but that it indicated, according to its nature, either an inflammation or a mere active or passive congestion, or a submucous hemorrhage.

The first degree of morbid state observed in the intestinal mucous membrane of phthisical patients, is an alteration of its colour, without any other modification of its physiological qualities. Often, for instance, it presents a tint of a more or less bright red; at other times it is brown, greyish, or slate-coloured; at other times, and this latter appearance is far from being uncommon in phthisical patients, it is studded by an infinite quantity of small, black, elongated points, somewhat like the delicate lines formed by passing the fine capillary extremity of a pencil, dipped in black colouring matter, over white paper. These black points are very different from those which constitute the glandulæ aggregatæ of Peyer. When these points are very numerous, they give a black tint to the inner surface of the intestine; when they are less numerous or smaller in size, its colour, on the contrary, is but little changed, and it is necessary to seek for them in order to find them. On examining them with the microscope, we see that all these black points exist in the intestinal villosities, and particularly on the summit of the latter. In most of the individuals wherein we detected the existence of these black points to a great extent, and in whom the intestine did not present any other trace of alteration, there had been chronic diarrhœa. We have no doubt but that this is a pathological state peculiarly appertaining to the intestinal villosities.

115. In other phthisical patients, who have presented for a longer or shorter time before death traces of intestinal irritation, announced particularly by diarrhœa, we find the mucous membrane of the small intestine, and of the large intestine, generally white through its entire extent. If further research were not made, one might easily in such a case consider the intestinal canal as very healthy, and conceive a purging independent of any appreciable pathological state of the mucous membrane. However, an attentive examination enables one most frequently to discover some alteration either in the mucous membrane itself, which has retained its natural colour, or in the tissue subjacent to it. Thus in several cases we find the free surface of this membrane studded with numerous white or greyish granulations, which appear to be follicles more numerous, or at least larger than in the normal state. At other times the white colour is as it were interrupted from space to space by small, red, brown, or black circles, which are scarcely perceivable except when the membrane is carefully washed and cleaned. In the centre of this circle there often exists another red or black point. It is very probable that this again is a species of alteration of the follicles: and if, in the human subject, any doubts may be entertained on this matter they no longer exist when this same modification of change is observed in the horse, where it is common enough. In this animal very manifest follicles are surrounded oftentimes by a similar red or black circle, which seems formed of very small vessels variously interlaced. At the same time that this coloured circle circumscribes the follicle, another smaller circle, red or black as the former, crowns in a manner the edges of its central orifice; this circle, as the preceding, is formed of a group of vessels curiously injected.

The mucous membrane of the intestine, like that of the stomach, may have retained, or at least recovered its whiteness, and it may be softened so as now to constitute merely a liquid pulp. What we have said of the nature of the softening of the gastric mucous membrane can apply also to softening of the intestinal mucous membrane.

At other times, in fine, this latter membrane, white and apparently healthy, is raised by serosity accumulated in the cellular tissue interposed between it and the muscular tunic. Thus, sub-mucous œdema, still more common in the large than in the small intestine, frequently coincides with an anormal development of follicles on the surface of the mucous membrane, and particularly with the existence of the small red or black circles already described.

In others, instead of this serous infiltration, and always with a white mucous

membrane, we find the submucous cellular tissue thickened, indurated, and the musular tunic more or less hypertrophied.

116. We have already marked some of the morbid states presented by the intestinal follicles in phthisical patients. Instead of merely presenting a double injected crown, if I may so say, at their circumference and at their central orifice, we often enough see them coloured uniformly through their entire extent; and if, at the same time, they are swollen, which is the most usual case, the result is a species of pimples (*boutons*) or pustules, scattered in greater or less numbers over the inner surface of the intestine. Sometimes they present different shades of redness; sometimes they are white, and then from their cut apex, or sometimes from their orifice, which is dilated and rendered visible to the naked eye, a purulent matter flows. Such is, in our opinion, the probable source of these species of small abscesses which we have sometimes found in the intestines of phthisical patients. May it happen that under certain circumstances this purulent matter, secreted by the follicles, is modified in its nature: that it becomes concrete, friable, and of a cherry appearance: that, in a word, it is transformed into tuberculous matter; and that thus we may be led to admit that intestinal tubercles often have their seat in the mucous follicles in the state of chronic inflammation? What is certain is, that in horses we have more than once found some follicles of the intestinal canal filled with a cheesy matter of a tubercular appearance. Shall we instance here, for the purpose of still further strengthening this opinion, with respect to the probable origin of a great number of intestinal tubercles, the singular varieties of secretion, which the mucous follicles presented in horses? Thus, in these animals they are sometimes found filled with a sebaceous matter resembling that which exists in the *tannes* of the skin, which, as is well known, are nothing else but cutaneous follicles more or less enlarged. Shall we here again mention, that in horses the parietes of the inflamed mucous follicles sometimes undergo a remarkable change of texture? Both in the substance of these parietes, as well as in the cellular tissue external to the prolongation of the mucous membrane which forms them, we have seen masses of fibrous or cartilaginous tissues become developed. Thence resulted large tumours, the nature of which was sometimes indicated by the central orifice, whilst in others it seemed to have been obliterated. Thus, then, once deranged from its normal mode of nutrition, a tissue, an organ may undergo the most varied changes, and ultimately become so unlike itself, that its real nature may be completely misconceived: a tissue of a new formation may then be readily made of it: this has happened with a great number of intestinal tubercles.*

These tubercles, moreover, are scarcely ever met in the intestines, without some being also found in the lungs, and frequently also in other organs. By this we mean, as has been already said, that by reason of the individual predisposition, in every part where a process of irritation or congestion has been set up, this process is identical; that every where it gave rise to a secretion of the same nature, the product of which was the matter called tuberculous. Thus in other individuals, wherever a mucous membrane is inflamed, without this inflammation being intense, it becomes covered with false membranes; in others, every irritation, however slight it may be, produces numerous abscesses, which are not preceded by any precursory local sign, so inconsiderable was the pathological process which was sufficient to give rise to them.

Of all the parts of the digestive tube, the termination of the jejunum and ileum

* The opinion which consists in considering intestinal tubercles as having their site in the follicles, has been already published by several authors, and M. Billard has recently supported it by new facts (De la Membrane muqueuse gastro-intestinal edans l'Etat sain et dans l'Etat inflammatoire, 1825).

are those where tubercles are most frequently developed. We have met them much less often in the commencement of the first of those intestines, not oftener than in the duodenum. More rarely again are they observed in the cæcum, and in the ascending and transverse colon; we never met them in the other portions of the large intestine.

Intestinal tubercles are principally developed, and have their primary seat on the external surface of the mucous membrane, that is, where the follicles also existed. They are sometimes seen very small, similar to white points, which are scarcely the size of a small pin's head; the largest we have seen were the size of a common pea. Whatever be their size, they present themselves under the form of rounded masses, of a dull or yellowish white, most frequently separated from one another, and much more rarely collected together. They project beneath the mucous membrane, which they raise, and which is often very healthy around them. On passing the edge of a scalpel slightly over them, the mucous membrane covering them is raised, exit is given to tuberculous matter, and in the place which it occupied there is observed a small cavity, with white edges, elevated and rounded, which perfectly resembles an ulceration. At other times, on the summit of the tubercle, there manifestly exists a small opening which seems to be the dilated orifice of a follicle. If it be objected to this opinion, that this orifice should be found on the summit of all the tubercles, if it were natural, we would answer by referring to some follicular tumours of the skin, whose orifice has also disappeared, whether it may have been obliterated or at least effaced.

Sometimes through the entire extent of the canal, no other lesions are found but these tubercles, such as we have described them. But in the majority of cases, there are observed, at the same time, either different colourings of the mucous membrane, or ulcerations varying in form and size, at the bottom of which some debris of tuberculous matter are often found.

There comes a period when this matter changes in consistence, and becomes softened, like that which constitutes pulmonary tubercles. As the latter, by becoming softened, occasion the erosion and destruction of the portions of the bronchial parietes with which they are in contact, in the same manner the intestinal tubercles, according as they lose their primary consistence, inflame the mucous membrane which covers them, bring on its ulceration, and make an exit for themselves. Then in the parenchyma of the lung, as in the inner surface of the intestine, there exists a cavity whose parietes are inflamed, and secrete a purulent matter, the quantity and qualities of which are very variable. In intestines full of tubercles, we have often met ulcerations which bore a great resemblance to pulmonary caverns; they represented, as the latter, anfractuous cavities, separated by bands of an irregular form.

In some cases, at the same time that the tubercles raise the mucous membrane which they tend to destroy, they are also developed on the side of the muscular tunic; they separate its fibres, and are found in contact with the peritoneum, which is ultimately destroyed, in the same manner as the mucous membrane. The result of this is a solution of continuity of the intestinal parietes, which usually gives rise to a peritonitis which is promptly fatal, but which has sometimes remained closed up for a longer or shorter time by a tuberculous mass.

117. Most of the alterations of texture, which chronic enteritis may produce in the intestinal mucous membrane, have been observed in phthisical patients; thus more than once we have seen vegetations, fungous growths, variable in form and in size, project from the inner surface of their intestinal mucous membrane; in other cases we have seen a purulent layer line all the great intestine, the mucous membrane of which was red and puffed beneath it.

There is a very uncommon alteration of the intestinal canal, and one which we have twice met in phthisical patients, namely, very extensive gangrene of

the mucous membrane. One of these patients had diarrhœa for the last three months previous to his decease; he frequently complained of rather severe colics; the appetite was for a considerable time lost; he did not vomit; but the taking food into the stomach was followed by pains in the epigastrium. The pyloric portion of the stomach was found to be of a brown colour. Numerous ulcerations, all round and very small, existed in the intestine. In several points the mucous membrane was raised by tubercles, several of which presented a small hole towards their centre. The inner surface of all the ascending colon, and that of the transverse colon, to the extent of half a foot, presented, as it were, a granular appearance, a uniform deep black colour, and a fetid, really gangrenous odour exhaled from it. In the rest of the great intestine, numerous ulcerations were observed, with a reappearance of gangrenous patches in some points. This gangrene existed only in the mucous membrane.

118. Of these different alterations, we see that there is but one really peculiar to phthisical patients, that is, the presence of tubercles under the intestinal mucous membrane, whether these tubercles depend on a simple morbid secretion going on in the meshes of the cellular tissue, or result from a morbid state of the follicles.

119. Whatever be the lesions of which the mucous membrane may have been the seat, these lesions most frequently go under the common term ulcerations, which present, with respect to their number, form, nature of their edges and bottom, important varieties, for the description of which we refer to another part of the work. Nothing is more common than the existence of these ulcerations towards the end of the small intestine, and in the cæcum of phthisical patients with chronic diarrhœa. We have remarked that it was often around these ulcerations, that tubercles were met in the greatest number; often also some few vestiges of them are found in the intervals; but their edges and lower parts are filled with them.

120. Hitherto we have seen in the intestinal canal of phthisical patients, those lesions merely which may be all referred to a process of irritation more or less evident; but, as well as the stomach, the intestinal canal has also occasionally presented to us quite the opposite state. Its parietes, considerably attenuated, seemed to consist merely of a mucous layer of very trifling thickness, and of a pale and transparent cellular tissue, in the midst of which there were only seen some colourless fibres, vestiges of the muscular tunic. In this state, which we account for in the same way as for that of the stomach by a diminution of the powers of nutrition, or, if you will, by a weakening of what the Germans call the *nisus formativus*, the intestine becomes filled and distended by a great quantity of liquids, as if being rendered totally inert, and really atrophied, its parietes could no longer perform but imperfectly the peristaltic movement necessary to the expulsion of its contents.

121. Finally, there is another kind of alteration of the lower extremity of the intestinal canal, which has been observed to be very common in phthisical patients; I mean fistula in ano. We know not how the opinion so generally diffused, that this fistula is very frequent in individuals affected with pulmonary tubercles, could have been accredited; nothing is more inaccurate to our observation, for out of above eight hundred persons, manifestly in different stages of phthisis, we met fistula in ano but once.

122. The different alterations now mentioned may be all equally the result of an acute or chronic affection; we must, however, except from this tubercles, whose formation is but rarely acute, and the attenuation of the intestinal parietes, which is necessarily the result of a chronic affection. It is then principally the different forms of lesion, which, by almost unanimous consent, are referred to an inflammatory process, which may equally come on rapidly or slowly, according to the case. Hence very different symptoms arise.

When the intestinal inflammation is of an acute character, and is at the same time intense to a certain degree, it often happens that the chronic affection of the lung, which we suppose already considerably advanced, temporarily changes its aspect, if I may so say, with respect to several of its symptoms, local and general. Sometimes it becomes less apparent; the cough is less frequent, the expectoration less profuse, the breathing seems less embarrassed; sometimes, on the contrary, it becomes worse, and the dyspnœa in particular becomes greater. In both these cases, the intestinal irritation acts as a revulsive, which, according to several circumstances more or less appreciable, produce in some an obvious improvement in the disease, whilst in others it exasperates it. At the same time the febrile movement, which already existed, changes its character; we no longer observe those double accessions, which are terminated by a profuse sweat: the latter is suppressed, the fever becomes continued, the tongue presents, according to the intensity of the intestinal inflammation, a white appearance dotted with red, or a uniformly red colour; subsequently it becomes dry and brown, is covered with black crusts, as are also the teeth and lips; the abdomen becomes tympanitic, there is diarrhœa or obstinate constipation; very frequently also nervous symptoms are observed; intermittent or continued delirium, subsultus tendinum, convulsive movements, incontinence or retention of urine, etc. In a word, all the series of phenomena characterising what are called essential fevers, present themselves. This complication carried to a certain degree, is one of the tolerably frequent causes of the premature death of phthisical patients. On examining the body, we often find, to account for these symptoms, merely intense redness of the intestinal mucous membrane; this redness most frequently is observed only in a circumscribed part of the canal, but in some rare cases it attacks the entire.

The symptoms are very different when the inflammation assumes a chronic character; it is then reduced merely to its local symptoms, and these again are often but slightly marked. Thus, for instance, many phthisical patients, whose intestinal canal is found inflamed, ulcerated, filled with tubercles, and very much disorganised over a vast extent, have not complained of any considerable pain, affecting the abdomen; this is the most general case. The belly remains soft, nor does pressure on it occasion pain. In some each alvine evacuation is preceded only by a slight colic; in others the stools are not even preceded by any painful sensation. The evacuations most commonly consist either of a clear, serous liquid, which the patients compare to water coloured yellow or green, or of thready commonly called glairy mucus, or of a greyish very fetid pap-like substance, or finally, though more rarely, of real pus. It seems to us impossible to connect each of these species of evacuation with a determinate alteration of the intestine; all they indicate is, that this intestine is altered; and as, nine times out of ten, this alteration is the result of inflammation, we must thence conclude that the diarrhœa in phthisical patients is, in this same proportion, the sign of an enteritis or a colitis, and most frequently of one or other of these inflammations combined. The long duration of the purging is a probability for thinking that the intestines are ulcerated; but in this respect there never is any certainty. There is one thing which always appeared to us very remarkable, namely, that in some phthisical patients, who had slight purging, and that for only a little time, without any other symptom affecting the abdomen, we have found numerous ulcerations either in the small intestine, or in the cæcum, whilst in others, whose diarrhœa was of a longer standing and more profuse, we sometimes found nothing but mere injection of the mucous membrane. A woman, having a cancerous affection of the stomach, and who died in the wards of M. Fouquier, in the August of 1825, had for a long time back considerable diarrhœa (a phenomenon which seldom accompanies cancers of the stomach). In this woman the intestinal mucous membrane was not even

injected; the contrary, it was for its entire extent remarkably pale; it had retained its natural consistence; its follicles were not enlarged, but from the duodenum to the end of the large intestine, there was serous infiltration of the submucous cellular tissue; this infiltration was considerable enough perceptibly to raise the mucous membrane, and to be visible through the substance of this latter. Thus, in this case, the diarrhœa was not connected with any existing appreciable alteration of the mucous membrane.

123. It is not always at the same period of pulmonary phthisis that the intestinal canal becomes affected. In this respect phthisical patients may be divided into four classes: in the first we shall place those, in whom the affection of the intestine seems to precede that of the lung. In the second we shall range those in whom this double affection arises and proceeds simultaneously. The third class will comprise those patients, who for a long time presented only some signs of pulmonary tubercles, and in whom the purging or other signs of intestinal affection supervene only at an advanced period of the pulmonary phthisis. The fourth class shall be reserved for those who die phthisical, the intestinal canal remaining uniformly healthy, which is the most uncommon case. We shall present a summary of our observations on these different cases.

We have often seen persons at La Charité, who were for a long time labouring under chronic diarrhœa when we first saw them. They were already in a more or less advanced stage of marasmus; they had a continued febrile disturbance, with an accession one or twice a day; they had no cough, nor had they ever had any; their breathing was free, auscultation and percussion announced a healthy state of the pulmonary parenchyma. They had, if I may so say, merely *intestinal phthisis*. But after a longer or shorter time, a little cough began to appear, deep inspirations became impossible, more or less profuse hemoptysis took place; auscultation and percussion as yet gave no information, but the symptoms altogether were sufficient to incline us to suspect the existence of pulmonary tubercles, which being developed consecutively to the intestinal phthisis, became an alarming complication of it; if, then, the individual died, we found traces of chronic inflammation in the intestine, whilst in the lung there was as yet nothing but crude tubercles, and those few in number. At other times, the patients prolonged their existence for a longer time; the pulmonary tubercles went on increasing, and they did not die until the pulmonary parenchyma had numerous caverns, the presence of which was detected by auscultation.

In cases of this kind, a slight cough may be the only morbid phenomenon marking an affection of the lung. Too often preoccupied by the primary disease of the intestine, referring to it with good reason both the marasmus and all the serious symptoms which are observed, the physician does not always pay sufficient attention to this cough; he allows it to become domiciliated, as it were, and it is only the autopsy which shows that pulmonary tubercles are the cause of this cough. Convinced by observation, that persons affected with chronic enteritis have a fatal tendency to pulmonary phthisis, we think we should never neglect to combat, by active means, the colds with which they are affected, however slight they appear. Too often, in this case, temporising has been fatal: in consequence of it, a slight bronchitis has rapidly given rise to numerous tubercles, and from that time cure was quite impossible; for it is not under such a combination of circumstances that one can hope to bring about the cicatrisation of the caverns.

Case 16.—Symptoms of chronic entero-colitis preceding those of the pulmonary affection—Tubercles in several of the abdominal viscera.

A man, twenty-eight years of age, tall and muscular, had been residing in

Paris for the last five months, since which time he had slight diarrhœa, which was suspended several times. For the last eight days he had a cough.

The beginning of March, he entered the hospital, and was prescribed mere diluent drinks, he being considered to be affected with one of those irritations of the intestinal mucous membrane so common, and so often kept up by bad treatment and irregularities of diet. Pulse frequent. Three palettes of blood were taken from him. During the entire month of March, the cough and diarrhœa succeeded each other alternately. Breathing a little short; expectoration that of acute catarrh. Percussion and auscultation detected nothing; stools watery, sometimes preceded by colicky pains. Pulse still frequent. Patient lost flesh and strength. This affection, which at first seemed to consist in a temporary irritation of the gastro-pulmonary mucous membrane, now began to assume a more serious appearance. The beginning of May, the cough diminished and the diarrhœa became very profuse. M. Lerminier now resolved to try the effect of a powerful revulsive, and applied a large blister over the abdomen; this diminished the diarrhœa, but the cough became more severe, and the oppression was also increased. The patient became more emaciated every day; cough still continued. The diarrhœa returned; the stools became bloody; on the 16th of May he got up several times without assistance to go to stool; there was no appearance of death being near at hand, and in the evening of this day he expired without a struggle.

Post-mortem. The lungs were studded with an immense number of miliary granulations, of a greyish white colour, semitransparent. At the apex of the left lung there was found a mass of tuberculous matter, the size of a large nut. The mucous membrane of the trachea and bronchi, through their large and small ramifications, were intensely red. A considerable quantity of lemon-coloured serum was effused into the peritoneum. Tuberculous masses were found in the posterior epiploic cavity, behind the pylorus, near the small lobe of the liver and above the pancreas, which was very large, but healthy. Nothing remarkable in the small intestine. The inner surface of the large intestine, from the cæcum to the rectum inclusively, was studded with a considerable number of black points, separated from each other, and surrounded with slight puffiness of the mucous membrane. In three other places there were found three small ulcers, each capable of holding a five sous piece, black at the edges and bottom. The mucous membrane of the rectum was white, but extremely soft. Some small crude tubercles were found in the liver; a much greater number were found in the spleen; they were also of a larger size; some were beginning to soften; some tubercles were also found in the substance of the two kidneys.

In this patient, the organ which seemed most seriously affected during life, was the intestinal canal. From all the symptoms one would expect to find much more serious alterations in the digestive tube, than those which were found there. With respect to the lungs, the lesions found in them were not at all recognised during life; they might have been suspected from the general symptoms, but no local morbid phenomena could afford any certainty of their existence. Here, then, it was the abdominal affection which predominated, and it was to it that the cause of the alarming symptoms must be referred, which ultimately terminated in the patient's death. We see in this case a remarkable example of those sudden deaths which happen prematurely, if I may so say, and which, common as they are in chronic diseases, are still unexplained.

Sometimes pulmonary tubercles have preceded chronic enteritis; but whilst the latter, once produced, has not ceased to progress, the others remained stationary, so that one might say that they have but a small share in the production of the symptoms. Here, without an exact knowledge of the previous circumstances, one would naturally be inclined to think that the pulmonary

phthisis followed the intestinal phthisis, whilst it is not in this way that nature has proceeded. The following case will afford an example of this kind.

Case 17.—Pulmonary phthisis which seems to become stationary, and the symptoms of which disappear at the same time that a chronic gastro-enterite manifests itself, the development of which follows the administration of Le Roy's purgative, and which is the principal cause of death.

A man, thirty-five years of age, contracted pulmonary catarrh, 1820, during which he had several attacks of hemoptysis. During the year following he continued to cough, he became emaciated, and again spit blood several times. For the purpose of curing himself of his cold, he took strong doses of Le Roy's drug. From that time profuse diarrhœa set in, which continued till the month of April, 1824, at which time he entered the La Charité; his state was then as follows: — Extreme emaciation; diarrhœa, with slight colics before each evacuation; cough slight; expectoration catarrhal; chest sonorous in every part; respiratory murmur generally clear and loud; no dyspnœa; pulse frequent; skin habitually hot and dry. From all the symptoms the principal disease seemed to be in the digestive tube; still the long standing of the cough, the occurrence of the hemoptysis, should make one apprehend the existence of pulmonary tubercles, but for this there was only mere probability; the patient became weaker and weaker, and died the 16th of June, 1824.

The *post-mortem* presented but a small number of crude and small tubercles towards the summit of both lungs. Bronchi but slightly red. The mucous membrane of the stomach was observed to exist merely in the form of separate patches of greater or less breadth, separated by white spaces, where the tissue lying under the mucous membrane was exposed. The end of the small intestine presented on its inner surface but one immense ulceration with black colouring of its bottom, was formed of the sub-mucous cellular tissue considerably thickened. Around the cæcum there were found enormous masses of lymphatic ganglia transformed into tubercles.

It is very probable that, in this individual, tubercles existed in the lung for the last four years; but they remained stationary, and acted but a very secondary part in the emaciation and death of the patient. The cause under the influence of which the chronic gastro-enterite was developed is here very evident.

In some persons we have seen the tubercles preceded in their development by the group of symptoms constituting the *mucous fever* of several nosologists. Persons in good health, but of delicate constitution, of a lymphatic temperament, and seemingly disposed to scrofula, entered the La Charité in a state of general languor. The face was pale, eyes dull, features immoveable, intellect heavy, movements slow and listless; there was a well-marked and continued febrile disturbance. Did we seek for the cause of these symptoms in a local affection? Nothing was found on the part of the thoracic organs, and the digestive apparatus seemed to be the sole site of any lesion. But this lesion had something peculiar, and different from the characters of ordinary gastro-enteritis. Thus the tongue presented no trace of redness, it was covered with a very thick whitish coat, and all the mucous membrane of the mouth secreted a great quantity of mucosity. The abdomen was soft and free from pain, appetite completely lost; without there being either nausea or vomiting there were alternations of constipation and of mucous diarrhœa. However, these patients became more and more emaciated, then they began to cough; their expectoration, at first mucous, became purulent; caverns, announced by auscultation, were formed in their lung, and they died phthisical. On opening the body tubercles were found in the lung in different states, and in the digestive tube undoubted traces of inflammation; red softening of the gastro-mucous mem-

brane ; ulcerations more or less numerous in the remainder of the intestine. The autopsy here showed lesions entirely similar to those found in other individuals who presented during life symptoms totally different. So true it is that, by reason of various temperaments and individual predispositions, the same mode of organic alteration may produce functional disturbances widely different. In the individuals whose history we have now traced, the inflammatory process first attacked principally, perhaps, the mucous follicles of the entire digestive tube : it is certain, at least, that in the mouth they were especially affected. It is, perhaps, from their destruction that the intestinal ulcerations resulted at a later period. Be that as it may, this inflammation (for we must apply this generic term to the pathological process which produces ulcerations, at the same time that we acknowledge that we must not confound it with others announced by different symptoms), this inflammation, I say, a long time confined to the digestive mucous membrane, was propagated to the bronchial mucous membrane, and by reason of the temperament and predisposition of the patients, the inflammation of the bronchi was soon followed by tuberculisation of the lung.

Let us direct our attention to other cases in which the twofold affection of the lung and intestines seems to arise simultaneously, to progress simultaneously, and to contribute equally to the death of the patients. These cases are more common than the preceding ; the commencement of the disease seems to announce nothing alarming ; there are observed for a longer or shorter time continued alternations of cough and diarrhœa, as if the irritation went alternately from the bronchial to the intestinal mucous membrane. Under the influence of suitable treatment these alarming symptoms appear to cease ; but they reappear from the least deviation from regular regimen, from the least accidental cause. At first the general health is but little altered ; but according as the pulmonary and abdominal fluxes become more frequent, both health and strength diminish. At last a period arrives when the bronchitis and enteritis no longer alternate, but exist simultaneously ; then more serious symptoms ordinarily begin to appear if a suitable treatment is not employed and followed up regularly ; and too often, in spite of this treatment, signs of pulmonary tubercles manifest themselves, the continuance and profuseness of the diarrhœa announce a constantly increasing severity of the intestinal affection ; thence oftentimes arise all the symptoms of acute phthisis, and a termination which is speedily fatal.

It should, on the contrary, be considered as a fortunate circumstance that the pulmonary phthisis runs through its first stages without being accompanied by signs of intestinal irritation. This happens in some cases, but unfortunately too rarely. We see phthisical patients in whom tuberculous excavations already exist in the lungs, and who have not yet had any diarrhœa; they are even habitually constipated. But ultimately a period arrives when, under the influence of causes more or less appreciable, some diarrhœa supervenes ; inconsiderable at first, and often intermittent, it goes on increasing, becomes continued, and contributes very much to accelerate the death of the patient.

Lastly, we have said, there are some phthisical patients who die without ever having presented any morbid phenomena on the part of the intestines, and in whom these are found in a healthy state. This case must be considered as the most uncommon of all, especially if we take into account the facts already stated, and which prove that an intestine is not free from disease, for this sole reason, that its mucous membrane presents a white colour. Pathological anatomy has made great progress in this department in latter years, and now we can say, in a much more general way, that it is only two years since almost all abdominal fluxes, and particularly those of phthisical patients, can be referred to an appreciable lesion of the intestines. With respect to the nature of this lesion, it appears to be inflammatory in the great majority of cases.

SECTION III.

DISEASES OF THE ORGANS APPENDED TO THE DIGESTIVE APPARATUS.

124. We include under this head — 1st. The peritoneum; 2dly, the lymphatic vessels which take the chyle into the intestinal canal, and the mesenteric glands into which they enter; 3dly, the different glands which pour a particular liquid on the internal surface of the digestive tube, namely, the salivary glands, the liver, and the pancreas.

125. Inflammation of the peritoneum is not a very rare affection in phthisical patients; it may exist in them in the acute or chronic form.

The acute peritonitis of phthisical patients oftentimes comes on without a known cause; but most frequently it is owing to an intestinal perforation, an accident which, in phthisical patients, is however less common than one might be inclined to suppose, considering the great frequency of the ulcerations which occur in the intestinal canal. But these ulcerations, without perforation, are themselves frequently in phthisical subjects a cause of peritonitis. This happens principally when these ulcerations are very deep, and when the muscular membrane, being laid bare, forms the bottom of the ulcer: observe then the peritoneum around the latter; you will find it oftentimes injected, red, and covered even with a purulent exudation; sometimes, also, this partial inflammation extends to another portion of the peritoneum, appertaining to an intestinal convolution, and which is in contact with that where the ulceration exists; then adhesions may be set up between these two intestinal convolutions, and at a later period, if the ulcerations perforate, these adhesions will form a fortunate barrier which circumscribe the effusion. We have several times observed this process of nature.

These peritoneal inflammations of a partial nature, and thus limited to the parts around one or more ulcerations, do not ordinarily occasion any particular symptom which can indicate their existence; but they often become more or less general, and then they are characterised by the ordinary symptoms of these formidable inflammations. Sometimes, however, though assuming an acute character and occupying a great extent, inflammation of the peritoneum has attacked phthisical patients without being announced by this acute pain, which is one of its most marked signs. Such, in particular, was the case of a young man eighteen years old, who entered the La Charité presenting all the symptoms of pulmonary phthisis with the existence of cavities, and having at the same time profuse diarrhœa; the abdomen was perfectly soft and free from pain. Suddenly he was seized with vomiting of a greenish matter; his features became very perceptibly altered all at once; pulse became very frequent; abdomen showed a tendency to become painful, and he died on the third day after the appearance of these new symptoms. On opening the body tuberculous cavities were found in the lungs, numerous ulcerations in the intestines, and still further, purulent effusion into the peritoneum.

Chronic inflammation of the peritoneum is also observed in a certain number of phthisical patients. But sometimes, like inflammation of the intestinal mucous membrane, it precedes the development of pulmonary tubercles; sometimes it shows itself at different periods of their existence. In both cases its commencement is sometimes marked by symptoms so slight, it is often so completely free from pain, that its diagnosis may present considerable difficulty. On the other hand, as it alone may produce hectic fever, marasmus, and a certain degree of dyspnœa, it follows that when it is primary, the period at which it is complicated with pulmonary tubercles, it is often impossible to determine; thus, in certain cases, the existence of the latter was only ascertained by a *post-mortem*

examination. What then should be the signs that could make us recognise them? They could only be those afforded by the expectoration and auscultation. But as long as tubercles are in a state of crudity, it is evident that these signs can yield but very vague information.

Amidst peritoneal adhesions, masses of tuberculous matter are very frequently developed in phthisical patients, which here, as in the pleura, are very evidently the result of a morbid secretion which has taken place in a serous membrane attacked with inflammation. Here even, by means of an attentive examination, we may see simple membranous concretions confounded by insensible shades with what is called tuberculous matter; in certain cases the former resemble the latter only in their arrangement; thus they constitute small rounded granulations, separate or collected together, which seem as it were deposited on the surface of the peritoneum. At other times they have not only the form of tubercle, but they gradually acquire its other physical properties; the matter which constitutes them becomes friable, as if cheesy, or else these false membranes themselves secrete in the intervals between them a concrete semi-solid pus, which again constitutes one of the varieties of that which is so vaguely called tuberculous matter. From these facts we may conclude that in the peritoneum, as in several other organs already mentioned, tubercle is nothing but the result of a morbid secretion which has taken place on the surface or in the parenchyma of an organ more or less manifestly inflamed.

In some phthisical patients whose abdomen was swollen without pain during the latter periods of life, we have found in the peritoneum merely an accumulation of limpid serum, without any trace of inflammation, and without there being either in the vena portæ, liver, or heart, any appreciable lesion by which this ascites could be accounted for. We shall have an opportunity of returning to this point at a future period, as we wish to notice it here only as far as it may be connected with the history of phthisis.

The result of the facts already stated is that, in the case where there is but an affection of the intestinal mucous membrane, phthisical patients experience remarkable abdominal pains only in a manner exceptionally, and these pains become acute only when the peritoneum itself is inflamed. Lastly, it must not be forgotten that this latter inflammation, particularly when considered as a complication of pulmonary phthisis, may also present itself altogether free from pain, whether in the chronic state or even in the acute state. We once saw in a phthisical patient an abdominal pain having all the characters of peritoneal pain, produced, however, by another cause — namely, by a vast ecchymosis in the portion of the peritoneum which lined the muscles of the abdomen on the right side, and which extended from the umbilicus to the pubis. The serous membrane itself had its natural transparence and ordinary thickness, and presented no appearance of injection.

126. The mesenteric glands are generally affected in phthisical patients in the direct ratio of the affection of the intestinal canal itself. This rule, however, is liable to numerous exceptions: thus, more than once we have found enormous masses of glands in the mesentery, all along the vertebral column, and as far as the site of the thoracic duct, though the intestine was but slightly affected. At other times, on the contrary, the latter was very much ulcerated, and the glands were scarcely tumefied. From these facts we shall not draw the inference that the affection of the glands is independent of that of the intestines, and we do not seek to overturn by exceptions a general law. In these exceptional cases we rather recognise an effect of individual disposition, in virtue of which such a system of organs is more or less easily affected. Thus, in some, slight erysipelas of the arm is sufficient to occasion engorgement and oftentimes suppuration of the axillary glands, whilst, in others, an immense phlegmon of the upper extremity lets them remain almost intact.

The nature of the alterations of the mesenteric glands in pulmonary phthisis is of three species: — 1st, they present mere tumefaction of their tissue, with red, brown, blackish colouring, or sometimes only a pale grey colour; 2dly, they are filled with pus, which sometimes infiltrates them, and sometimes forms in them abscesses, so that by the extension of these the gland may be reduced merely to its enveloping membrane, which then serves to form the parietes of an abscess; 3dly, again, instead of secreting pus they may secrete a more solid matter, which is called tuberculous, and sometimes this latter secretion itself is modified in its turn, so as to produce in the midst of the gland small cretaceous masses, real stony concretions. There are cases where one may very well follow the gradual formation of the tuberculous matter in the midst of a mesenteric gland, swollen, red, and evidently inflamed; it is first seen to be in a manner arranged in the form of small grains of a yellowish white, which enlarge, increase in number, and extend more and more. Some persons have considered as a tuberculous state of the mesenteric glands, a state which, in our opinion, differs considerably from it. In this latter state, instead of containing a yellowish friable matter crumbling readily under the finger, these glands, having become larger than usual, are of a dull white colour, or shining like cartilage; they have its elasticity and sometimes its consistence; in all cases they are not broken up without considerable difficulty. We consider this state as being nothing else but the termination of a ganglionitis in simple white induration, approaching to that which takes place in certain portions of the cellular tissue, and in particular of the sub-mucous and sub-serous cellular tissue. It is probable that, in this case also, it is the cellular tissue intermediately between the lymphatic vessels which becomes thickened and hardened. This is what several medical men consider incorrectly, in our opinion, as a tissue of new formation (scirrhous tissue).

127. Not only the mesenteric glands are frequently affected in phthisical subjects, but the lymphatic vessels themselves also, which go from the intestines in these glands, have sometimes presented a very remarkable morbid state, and which sometimes had its site in the liquids contained by the lymphatic vessel, sometimes too in the parietes of this vessel. Thus, four or five times we have seen lymphatics, which passed on from intestinal ulcerations, filled to a great extent of their course with a semi-concrete purulent matter like to tubercle commencing to soften. As the vessel was unequally filled with it the result was swellings, a species of nodes more or less approximating to one another, between which the lymphatic vessel recovered its transparence or took on a whitish tint. But what was peculiarly worthy of remark was, that as long as the lymphatic traversed the parietes of the intestine, the small rounded swellings formed by the white and semi-concrete matter which filled them unequally, resembled perfectly the tubercles which are ordinarily developed in the form of granulation in the substance of the intestinal parietes. It would be premature now to attempt to characterise the nature and assign the origin of the species of tuberculous matter which we found in the lymphatics. Was it formed in these vessels themselves? Was it introduced into them by absorption.

Other lymphatic vessels which presented an appearance similar to the preceding, had, however, undergone another kind of alteration. It was no longer a foreign matter which was contained within them, it was their own parietes which, thickened and hardened in different places, produced swellings more or less marked. These vessels, as the preceding, were sometimes lost in the mesentery after a certain course, and sometimes might be traced as far as tumefied and tuberculated lymphatic glands.

These facts, as also others relative to certain alterations of the thoracic duct, which we have cited elsewhere, seem to us to possess considerable interest,

as being calculated to throw some light on the connexion of tubercles with certain morbid states of the lymphatic vessels. Hitherto much has been said of this connexion without its being demonstrated by any direct fact.

128. We shall say but few words regarding the diseases of the glands appended to the digestive tube. We never observed any affection of the salivary glands in phthisical patients. The liver presented some alterations, which have been already as well described as we could do it here. Of these alterations some may be more particularly considered as peculiar to phthisical patients; such is, first, the fatty state of the liver, whose existence we have discovered in about one-third of the patients who died of pulmonary phthisis in the wards of M. Lerminier. This state, the nature and cause of which are so obscure, did not appear to be announced by any particular symptom which could induce us to suspect its existence. It did not appear to us to coincide more frequently with a morbid state of the duodenum than with a healthy state of this intestine. We shall observe, however, that one of the most serious alterations which we found in the duodenum was in an individual whose liver had undergone the fatty degenerescence to a very high degree. In this patient, in fact, the duodenum, red through its entire extent, presented in its two latter portions a great number of small ulcerations, round or oblong, pressed one against the other, giving the mucous membrane in some measure the appearance of a sieve; their bottom was blackish, a colour important to be noted, because it seemed to indicate the former state of its ulcerations.

Another alteration of the liver, peculiar to phthisical patients, is the presence of tubercles in its parenchyma. In adults they are but rarely observed, scarcely once in fifty cases: we have met them more frequently in children. Sometimes, too, we have seen those tubercles in the appendages of the liver, or around them. Thus we have seen some in the substance of the parietes of the gall-bladder, which were not altered around them; others developed in the course of the different biliary ducts had partly obliterated the cavity and gave rise to jaundice; in two phthisical cases only, we have observed this kind of complication produced by the mechanical cause of which we have just spoken; the liver was fatty in one of these cases; in the other it appeared healthy. These are the only two occasions on which we saw jaundice in phthisical patients.

Other species of morbid change may have attacked the hepatic apparatus of phthisical patients; but these changes, entirely accidental, are not peculiar to them, as the fatty degenerescence of the liver seems to be; they may also exist separately, or coincide indifferently with all species of disease; to speak of them here would be digressing from our subject.

The pancreas is almost as seldom affected in phthisical patients as the salivary glands. Only once have we found it diseased; but even in this case its granulations were not altered; two or three small tubercles, each the size of a pea, were developed in the cellular tissue, which united these granulations to each other.

SECTION IV.

DISEASES OF THE URINARY APPARATUS.

129. With respect to the urinary apparatus, there is no occasion to repeat here what is written everywhere, namely, that in phthisical subjects it sometimes presents tubercles, either in the kidneys, or in the substance of the parietes of the bladder. In the kidneys, as in the different parenchymatous organs, a very healthy tissue most frequently surrounds these tubercles; at other times, the substance of the organ is red, softened, and inflamed. In one instance we saw

them limited to the cones of the tubular substance, of which all that now remained was merely its form.

With the exception of these tubercles, we have not found in the urinary organs any lesion connected with phthisis, and of which we might not as well speak when treating of any other disease, as when treating of this latter. However, we must not pass over in silence a fact which may serve to illustrate the etiology of tubercles. In a man who died in the La Charité, in the wards of M. Fouquier, we discovered a remarkable alteration of the urinary passages. The inner surface of the bladder presented a black colour of the mucous membrane, with numerous ulcerations, and perceptible thickening of the subjacent tissues; near its neck there existed an opening through which the urine passed to penetrate and sojourn in a pouch which might have held an apple at least. This accidental pouch was formed in the cellular tissue, interposed between the bladder and rectum. Its inner surface was lined by a smooth and blackish layer, which presented an appearance entirely similar to the mucous membrane of the bladder itself. But still further, this is the fact to which we here wish particularly to direct attention, the parietes of the pouch here mentioned were studded with a great number of small bodies of a yellowish white, irregularly rounded, readily crumbling under the finger, presenting, in one word, all the characters of tuberculous matter. Here the very commencement of the formation of this matter was evidently an inflammatory process; but in how many patients have similar lesions not been followed by the production of tubercles! Here, again, regard must be had to individual predisposition.

SECTION V.

DISEASES OF THE LOCOMOTIVE APPARATUS.

130. These are very few in phthisical patients. We shall direct attention, however, to the diminution in size, to the real atrophy which the muscles undergo in these patients. The want of colour of the fleshy fibre, the attenuation of the fasciculi which it constitutes, are connected with the state of the blood, in which it must be admitted *à priori*, that the quantity of serum greatly exceeds the quantity of fibrin and of colouring matter. These facts, generally known, may lead to the knowledge of the real nature of several lesions, which the internal organs of phthisical patients present. The species of atrophy which some of these undergo (the heart and digestive tube in particular), the diminution of their consistence (heart, intestines, nervous centres), may they not depend, as in the muscles, on a mere modification of nutrition, connected with a vitiated state of the function of hematosis, without its being necessary to admit a previous inflammatory process for several of these cases?

We have but very seldom seen tubercles in the muscles, and again, when we did meet them there, these tubercles were not situated in the muscular fibre itself, but rather in the cellular tissue situate between the different muscles, or between the fasciculi of one and the same muscle.

131. In four phthisical patients only have we met a perceptible alteration of the bones. In two of them pulmonary tubercles seemed to be the principal affection. In the other two they performed but a very secondary part in the production of the symptoms, and of death.

Case 18.—Tubercles in the tibia.

A young man, twenty years of age, presented all the symptoms of pulmonary

phthisis with cavities in both lungs; the lymphatic glands of the neck were swollen and painful; the skin covering them was red in some points. This patient had, at the same time, chronic diarrhœa, and, moreover, immediately above the internal malleolus of the right side, there was an indistinctly circumscribed tumefaction of the skin, with two or three small fistulous tumours, whence flowed a greyish, fetid pus. He referred the origin of this latter affection to a kick of a horse, which he had received on the lower part of the tibia. Previous to this, he had had some symptoms of pulmonary phthisis. At the autopsy, tubercles were found in the lungs in every stage; there were some, also, in the cervical, axillary, and mesenteric glands; the bronchial ganglions presented none; the intestinal mucous membrane was ulcerated in a great many points. The lower part of the right leg was carefully examined; the skin was separated to a considerable extent above and around the malleoli; in every place where this separation took place, the bone stripped of its periosteum was rugose and uneven at its surface. Still more, over the anterior surface of the tibia, there was a rounded cavity in the bone, capable of holding a nut, and in which a yellowish white matter was contained, still solid at its circumference, where it might be crumbled under the finger, like curd; at its centre changed into a whitish soft substance, which appeared particularly to consist of two parts, the one mere liquid, as it were serous, and the other consisting of small white clots, which swam in the former.

This case presents a very remarkable instance of tubercles simultaneously developed in several organs. The primary cause from which the affection of the tibia seemed to arise, is worthy of attention: it was, in fact, after external violence that the bone became the seat of acute pain, where it had been struck, and that the lower end of the right leg began to become swollen; at that time pulmonary tubercles already existed in the lung, so that the same disposition which had produced them in this organ, and in the lymphatic glands of different parts of the body, also favoured their development in the osseous system, where a process of irritation was momentarily set up. If the latter had appeared in individuals differently disposed, it would have had different results. We think we cannot too often point out that infinite variety of phenomena, which one and the same cause may produce, according to the idiosyncrasy of the individuals on whom it acts.

Case 19.—Tubercles in the bodies of the vertebræ and of the sacrum.

A man, forty years of age, died in the La Charité, in the wards of M. Fouquier. The lungs contained numerous tubercles. Before the body of the last lumbar vertebræ and of the sacrum, there existed an immense purulent collection, beneath which these bones were found divested of their periosteum. In the substance of the body of the two last lumbar vertebræ, small irregularly rounded cavities were formed, to the number of four or five, all being nearly the same size, each capable of containing a nut. Some communicated with the purulent collection. Others existed in the centre of the body of the vertebræ, and had not as yet an external opening. Each of these cavities contained a white, friable substance, altogether resembling the tuberculous matter of the bronchial ganglions. External to the two first anterior foramina of the sacrum, there existed another cavity longer than the preceding, and which contained merely some debris of tubercles, in the form of granular masses, suspended in the midst of purulent matter.

The presence of real tubercles in the vertebræ is a rare fact in pathological anatomy, or at least they are not often met in that state of crudity which will allow of their being readily recognised. In most of the cases where there is what is called *caries* of the vertebræ (a vague and very ill-defined term), nothing

else is found but a more or less complete destruction, a pulpy softening of one or more vertebræ, and often also mere inequalities on the external surface of their body, which is divested of periosteum, and is bathed in pus.

SECTION VI.

DISEASES OF THE NERVOUS SYSTEM.

132. The brain and its appendages are in the number of those organs which we have most constantly found healthy in phthisical patients, or at least most constantly exempt from lesions which we could appreciate. What we have now said is applicable only to adults ; for it is well known that in consumptive children tubercles very often exist in the brain. We never met any in those persons who died of pulmonary phthisis, in the wards of M. Lerminier, which proves at least that they are very rare. With respect to the cerebral membranes, the pia mater is very often found evidently infiltrated with serum, either limpid, or a little turbid, without its being possible to refer any morbid symptom to this infiltration, which is also found in the majority of those who die of chronic diseases. If, accordingly, after death the brain of phthisical patients be found generally healthy, this absence of lesion agrees with the general absence of symptoms arising from the nervous system which is observed in these patients. The different functions of animal life most frequently remain intact up to death, except that their energy is diminished : in some, however, delirium sets in some days before the fatal moment ; but to account for it, the brain and its appendages have not presented any uniform lesion ; sometimes we have found the pia mater more injected than usual, and a well-marked rosy tint of the cortical substance of the surface of the hemispheres ; sometimes a perceptible quantity of serum was effused either into the different ventricles, or principally at the base of the cranium ; sometimes we found the brain colourless, as well as its membranes, no effusion into the ventricles, or elsewhere, a natural consistence of the nervous substance : in a word, no lesion which could account for the delirium. No doubt, we cannot too much encourage and multiply those researches whose aim is to connect each functional disturbance of the brain, with an appreciable lesion of this organ ; beautiful and important discoveries have already been the fruits of researches of this kind ; but to say that in all cases where there has been disturbance in the functions of the brain, a lesion of the nervous centres must necessarily be found, is to express an opinion refuted by very numerous facts. Certainly this lesion exists, since in sound physiology we cannot admit that a function can be disturbed without the organ which is the seat of it being itself altered ; but what must be acknowledged is, that in the nervous system particularly, this alteration entirely escapes us in a great number of cases.

The following case serves to confirm the above assertions : —

Case 20. — This was the case of a woman, thirty-five years of age, who, three months before entering the hospital, lost her voice, which she did not afterwards recover. When we saw her, the laryngeal affection seemed the principal ailment ; the existence of pulmonary tubercles could only be suspected. However, the symptoms of phthisis subsequently became much more marked. This woman, after being some months in the hospital, suddenly, and without any known cause, fell into a state of coma ; the extremities of the right side, when raised, fell down as an inert mass ; their sensibility also went. Hemiplegia of the right side was evident. She died in a day or two after.

No morbid appearances were discovered in the brain. A small tubercular

cavity was found in the summit of one of the lungs, and in the remainder of it a great number of miliary tubercles. The chordæ vocales were ulcerated. — Death in this case occurred, as in a great number of cerebral affections, in consequence of the suspension, or at least the diminution of the nervous influence on the respiration.

133. Thus, in this case, a consumptive patient dies of a brain affection, and after death we find no appreciable lesion of this latter organ, or of its appendages. In some other consumptive patients, on the contrary, whose nervous system had not presented any very apparent functional disturbance, we found in the encephalon a very remarkable lesion of its central parts. The corpus callosum, in a portion of its extent, was visibly softened; but, above all, the septum lucidum and the fornix no longer existed, except in the form of a whitish pap, which was raised as a liquid substance, and which exposed the choroid plexus. This softening, or rather liquefaction of the fornix, terminated posteriorly at the commencement of each corpus fimbriatum, and anteriorly at the bifurcation of its anterior pillar; each of the divisions of the latter might be traced, as usual, as far as the mamillary bodies, which retained their healthy appearance. In one of these cases the white substance which forms the external covering of the optic thalami had participated in the pulpy softening of the fornix; it was partly destroyed, and exposed to view the grey substance; in fine, at other times, and always in consumptive persons, we also found softened, liquefied, and completely destroyed in several points, the species of white cortical substance which covers the inner grey substance of the cornua Ammonis. In these different individuals, we repeat, there was neither delirium, nor any apparent disturbance of the different functions of animal life. Neither did they present that exaltation of the sensibility of the skin of the trunk which has been recently remarked by a distinguished observer, Dr. Senn of Geneva, as one of the characteristic signs of softening of the central white parts of the brain. As we percussed and auscultated several of these patients a few days before death, this morbid exaltation of the sensibility of the trunk could not have escaped us if it did exist.

The softening now spoken of does not present, in an anatomical point of view, any of the characters of inflammation; we do not find, either around it, nor where it exists, any trace of vascular injection: there is nothing to prove that the softened substance contains pus, since it retains its natural colour; in a word, its consistence only is changed. A train of reasoning, founded on very admissible analogies, may certainly lead us to admit that this change of consistence is sufficient to prove the existence of inflammation. This opinion has some probabilities for it, but no fact proves its strict accuracy. As for our part, we would be disposed to compare the particular cerebral softening now in question, with certain softenings of the heart, of the muscles of animal life, and of the parietes of the stomach, the inflammatory nature of which we do not hold to be a thing proved, and which depend probably, as we have already hinted (111), on the greater or less change which the great phenomenon of nutrition must necessarily undergo in all the tissues, when, under the influence of a certain number of chronic diseases, the blood is no longer duly modified or repaired. Be that as it may, let us collect facts, and not endeavour to give a hasty interpretation to them. It is a great advance made in science to know how to suspend one's judgment on several points, whose solution does not seem doubtful, when they have been as yet but superficially studied.

SECTION VII.

DISEASES OF THE GENITAL ORGANS.

These organs we have found to be but seldom altered in phthisical patients. However, they do not escape the law in virtue of which tubercles, having been once developed in the lung, have a tendency to be produced also in other parts. Thus we have found these tubercles in the testicles, in the parietes of the vesiculæ seminales, in the tissue of the uterus, in the ovaries, and even in the substance of the Fallopian tubes. But these cases are uncommon, and the genital organs of both sexes must also be placed among those parts which, in phthisical patients, become least generally the seat of tuberculous degenerescence.

Neither must it be supposed that it is only in the cases where several parts have been attacked by tubercles that these organs also may be found affected with them; the contrary has been observed: thus, in a woman, twenty-nine years of age, the right Fallopian tube, being of a bright red externally, being considerably enlarged, contained in its parietes large masses of tuberculous substance. The two lungs were the site of immense cavities; the intestines were ulcerated; but in no part else were there any tubercles.

During life the genital organs seldom present any other obvious change except derangement of the menses in woman. With respect to this it is difficult to lay down a principle which has not its exceptions: there are some women whose menstrual periods are suspended from the time they begin to cough; there are others who continue to have them up to a very advanced stage of their disease. However, in the majority of cases, the menses continue for a considerable time after the appearance of the primary symptoms; and it is only at the period when the tubercles begin to soften, and when febrile disturbance is established, that the menses, after being first deranged, become ultimately suspended.

CHAPTER IV.

PROGRESS AND DURATION OF PULMONARY TUBERCLES.

134. Portal, Bayle, and other authors, have already remarked the numerous varieties which phthisis presents with respect to its progress and duration. A space of two years appears to us to be the mean term of the duration of this affection in the individuals whom we have seen in the Charité. But it is clear that one can no longer compare, with respect to its duration, the pulmonary phthisis affecting poor labouring persons, in whom the absence of necessary care tends to hasten its progress, and this same phthisis when it attacks persons in affluence. In the latter class it must, *cæteris paribus*, have a longer duration.

135. In the description of persons who are treated in hospitals, there are some, however, in whom pulmonary phthisis is prolonged for a much longer time, and takes on a progress remarkable for its slowness, absolutely speaking. Thus several patients had been affected with a cough for several years when we examined them for the first time. The profuse attacks of hemoptysis to which they had been subject, and the difficulty of breathing, which they had not ceased to experience since the very long period from which they dated the

commencement of their cough, the habitually delicate health in which they had remained from that same period, all appeared to indicate that in them the pulmonary tubercles, whose existence was proved by the autopsy, had been in existence for a very considerable time. But probably these tubercles had increased but very slowly both in number and size; no complication accelerated their progress; and by reason more especially of a happy disposition of the subject, they had not exerted a destructive reaction on any important organ; thence the long absence, or at least mildness of the symptoms, whether local or general. Such was, for instance, the case of an old man, seventy-six years of age, who, for the last thirty years and more, had cough and frequently spit blood, and in whom we ascertained in the *post-mortem* the existence of tubercular phthisis.

136. At other times, on the contrary, pulmonary phthisis takes on a very rapid course, and it may then be truly considered an acute disease. But here again several varieties present themselves, which we shall respectively notice.

137. First, there are cases in which pulmonary phthisis shows itself with its usual symptoms, only these symptoms develope themselves with frightful rapidity. Here two subdivisions must be established: sometimes the disease is acute from its commencement; sometimes, on the contrary, it becomes so only at a more or less advanced period.

Case 21. — A young man entered the Charité with symptoms of slight enteritis, which soon yielded to proper treatment; at this time no signs of pulmonary phthisis. When about leaving the hospital he caught cold; after a few days, fever, emaciation, alteration of features. Three weeks after, the cough, profuse sweats, such as are observed towards the latter period of phthisis, purulent expectoration, pectoriloquy, and gurgling, under the right clavicle; he died the fourth week. An enormous cavity in the upper lobe of the right lung.

Case 22. — This was the case of a young man, eighteen years old, who up to the beginning of March had enjoyed perfectly good health in every respect, except that he complained of pains between the left clavicle and breast. Towards the 6th he caught cold; on the 15th he had great oppression; strength diminished very much; return of the pain beneath the left clavicle; leeches applied to this part; he became worse, and entered the hospital on the 1st of April; at this period he had hectic fever; purulent sputa; loud gurgling all over the left side of the chest; purging; he died the 16th, about five weeks after the appearance of the cough. A number of tuberculous cavities in the left lung.

The next was the case of a man, thirty years of age, who had pulmonary tubercles which, for several years, occasioned the symptoms of the first stage of phthisis. When he entered the hospital, he presented merely the symptoms of pulmonary catarrh; at the end of ten days, however, a cavity was discovered under the right clavicle; he died in eleven days after the cavity was detected.

138. We have several times seen cases of pulmonary phthisis, which had been proceeding more or less slowly, suddenly become very acute, consecutively to an intercurrent pneumonia, a profuse hemoptysis, or even after an acute inflammation of the stomach or of another organ. The critical age in women is also a period during which we often see pulmonary phthisis, which till then had been announced merely by slight or faintly marked symptoms, suddenly change character and take on an acute course. Thus, after the period of from eighteen to thirty-five years, remarked by Hippocrates as that at which phthisis is most common, the critical age seems to us to be, in the case of women, the time when consumption carries off the greatest number of victims,

whether then having already manifested its existence for a long time back, it assumes a formidably acute form, or whether it only begins to appear in women who till then seemed only to have been predisposed to it, or whether, finally, it declares itself in women in whom, till this time, there was no reason whatever to apprehend its invasion.

139. Another form of acute phthisis is that in which the symptoms which it produces are not only remarkable, as in the preceding form, by their rapid succession, but they are no longer those which usually characterise the presence of tubercles in the lung.

Thus we have seen persons who, having for some time a very slight cough, were suddenly seized with a shivering, followed by violent continued fever, with considerable oppression, and sometimes acute pain in some point of the chest, particularly below one of the clavicles. These symptoms seemed to be particularly those of pneumonia or pleuritis. Several of the individuals in whom these symptoms were observed sunk rapidly, and we found, either at the apex of the lung, or in some other point of this organ, a large tuberculous mass, more or less completely softened, but not yet communicating with the bronchi. Probably, in these persons, the tuberculous mass had now existed for a longer or shorter time in the state of crudity. On the sudden softening the acute character of the symptoms seemed to depend. In other persons, these same symptoms, after appearing at first with such great intensity, became mitigated, and the phthisis resumed its ordinary course.

At other times, the rapid and simultaneous development of a great quantity of miliary tubercles in the lungs was announced only by greater or less suffocation, by a sort of acute asthma.

140. Lastly, there are patients in whom the rapid development of pulmonary tubercles is no longer even announced by any local symptom. These persons have a slight cough, no expectoration, or one purely catarrhal. A remarkable circumstance, their breathing does not appear to be impeded; if the chest be percussed, it is found to be sonorous in every part; if auscultation be employed, the respiratory murmur is heard everywhere loud and clear. However, there exists a continued fever with profuse night sweats; rapid emaciation takes place; and the patients having in a very short time attained the last degree of marasmus, often die before the alteration of the lung has become more manifest. In such cases the mere consideration of the symptoms would incline one to admit the existence of an essential hectic fever, of a nervous marasmus. But the *post-mortem* shows a great number of small crude tubercles developed in the pulmonary parenchyma. The very healthy state of the latter explains why percussion and auscultation yielded no information. The rapid increase in the number of the tubercles accounts, no doubt, both for the fever and the great alteration in the function of nutrition, and the promptness with which death supervenes. But why, in this case, did the breathing remain free, whilst in other cases, absolutely similar with respect to the nature of the alteration and the rapidity of its development, the dyspnœa was the predominant symptom? This great difference of the phenomena produced by one and the same cause, is, no doubt, very difficult to be explained; but this is in some manner a primary fact, which we constantly find in the study of disease, and from which we shall deduce one of the most important principles of pathology, on which the entire art of diagnosis actually rests, namely, that from one and the same lesion, all things else being equal, the most different symptoms may result, according to the individual. This inconstancy in the connexion between cause and effect, we can account for only by referring it to individual predisposition or idiosyncrasy.

141. The long duration of pulmonary phthisis is oftentimes owing to its taking on a really intermitting course: the symptoms which announce it are

seen from time to time to disappear more or less completely, then develope themselves subsequently, then improve to be again reproduced, and so on. Thus this disease presents to us the well-ascertained example of constant lesion, which, by reason of circumstances more or less appreciable, merely gives rise to some intermitting symptoms. It appears that, during this complete or incomplete suspension of the symptoms, the tubercles remain stationary in their development, and that, by virtue of a sort of habit, the pulmonary parenchyma is no longer irritated by their presence, like other organs, which can bear, without any disturbance of their functions, the presence of foreign bodies. But here, it may be asked, what proves that, in what we call the stationary state of tubercles, the latter bodies really exist in the lung, for most of the symptoms of pulmonary phthisis are sometimes produced by simple bronchitis? First, we might say, that when the latter simulates pulmonary phthisis, it is of long and continued duration, whilst the frequent returns of pulmonary catarrhs, each of which lasts but for a little time, is much more frequently connected with the presence of tubercles in the lungs. True, it might be replied, that these cases of bronchitis are suspended only when there is not yet the formation of tubercles, and that they become continued when once the latter exist. But we shall appeal to more direct proofs, and in order to demonstrate the possibility of the suspension of the progress of phthisis in its different stages, we shall have recourse, — 1st, To *post-mortem* examination; 2dly, to signs which appertain so characteristically to this disease, that from their sole existence we might conclude with certainty that the lung contains tubercles.

1st. Proofs afforded by *post-mortem* examination.

Case 23. — A laceman, twenty-nine years of age, having been always meagre and of a delicate frame, was seized with a profuse hemoptysis at the age of twenty-four; this ceased at the end of fifteen or twenty-days, but for six months the patient continued to cough; he became more and more emaciated; he was bled several times and blistered. At the end of this time the cough diminished, then ceased, the strength returned, and the patient nearly returned to the same state in which he was before his catarrh, as he called it, and resumed his occupations. At the end of about a year, a second hemoptysis, and reappearance of a new bronchitis, which lasted all the winter and ceased in spring. Two years passed on without any new symptom regarding the chest; only the breathing was habitually a little short, and the muscular system had but little energy. Having attained the age of twenty-eight, the patient had a new pulmonary attack, which did not set in, as the preceding attacks, by an hemoptysis; this attack lasted from four to five months, then it ceased again, and as completely as the others.

During the eight months preceding the entrance of the patient into the hospital the cough was gone, breathing free enough, and nothing indicated a morbid state of the thoracic organs. Finally, he was seized with an acute gastro-enterite, not very severe, and entered the hospital; he then gave us the preceding details. Since the commencement of the abdominal affection he began once more to cough; but this cough was slight, and seemed to be but a very secondary symptom. Auscultation discovered the respiratory murmur clear in every part but very strong. (Leeches to the anus; barley ptisan.) Continuance of the fever, redness of the tongue, epigastric sensibility, and diarrhœa during the three following days; then the abdomen became suddenly the seat of an acute pain, which was increased by the slightest pressure; it was hard, tense, and tumefied; the face was pale and the features sharpened; the pulse became extremely frequent; constant vomiting took place; these symptoms of peritonitis increased more and more, and carried off the patient on the fifth day of their appearance.

The *post-mortem* examination discovered in the two lungs numerous very small tubercles of a white or greyish colour, which were surrounded by a very healthy parenchyma. Sero-purulent effusion into the peritoneum; arborescent injection of the mucous membrane of the stomach in its splenic portion, of that of the lower fourth of the small intestine, and of the cæcum; some reddish pustules, with ulceration of one of them at its summit, a little above the ileo-cæcal valve.

In this case, it is very evident that tubercles existed in the lung before the appearance of the acute abdominal affection of which the patient died, and yet he had ceased to cough for some months, and though of a delicate constitution, he was in the enjoyment of good health. It is probable that tubercles commenced to develope themselves in the lungs of this person nearly at the same period at which the first hemoptysis showed itself; it is probable, also, that every time they tended to increase in number, and that the process which had given rise to them assumed a degree of activity, the cough, spitting of blood, and the other symptoms of pulmonary phthisis reappeared; they vanished when the process of tuberculisation became stationary. Here, also, in consequence of the nature of the tubercles, auscultation could give no information; let us remark, however, that the great intensity of the respiratory murmur indicated some obstacle or other to the free entrance of the air into the pulmonary vesicles.

2dly. Proofs afforded by the signs derived from auscultation.

Even in the cases where cavities are already formed in the parenchyma of the lung, the progress of phthisis may still be suspended for a longer or shorter time; its general symptoms may disappear, and thus one may see an individual who carries cavities in his lungs return for a time to a tolerable state of health. This we have observed in some cases where the existence of a cavity had been announced at the apex of either lung by a clearly-marked and exactly circumscribed gurgling; the other symptoms of pulmonary phthisis existed in a very high degree. At the end of a certain time the gurgling gradually disappeared, and it was succeeded by a sort of well-marked souffle at each inspiratory movement, as if, during each of these movements, a considerable mass of air entered by a narrow orifice into a large cavity. Where this souffle was heard there was evident pectoriloquy; these phenomena did not depend on induration of the pulmonary parenchyma, for the chest, when percussed, sounded equally well in every part. At the same time that these new phenomena had manifested themselves, the cough became more infrequent, the febrile movement had ceased, the expectoration lost its purulent appearance, both strength and flesh were re-established. What occurred in the lung?

Here we think we must admit, with Laennec, that the parietes of the cavity, lined with a fibrous or cartilaginous membrane, ceased to secrete pus. This is one of the cases in which diagnosis is admirably illustrated by the method of auscultation. If, at the same time, the symptoms of phthisis ceased, we drew this consequence from it, that little or no tubercles existed in the remainder of the lung. But in the majority of cases of this kind, the cure of phthisis is but temporary; for the disposition which already produced tubercles is not destroyed, and it is to be feared that at a later period it may again produce them, or give a new degree of activity to those already existing. This, in fact, is what is almost always observed. We shall return to this subject at another time, when we come to speak of the termination of phthisis; but we could not avoid pointing out just now this tendency of certain cavities to cicatrisation, as being one of the causes under the influence of which pulmonary phthisis, having already reached its last stage, may retrograde, and be suspended for a longer or shorter time.

142. Several manifest causes contribute to interrupt and put an end to the stationary condition of pulmonary tubercles. Such are most of the diseases which attack the lung or even other organs. After a pneumonia, for instance, we see pulmonary tubercles, which till then had manifested their existence only by very equivocal signs, become on a sudden very manifest, and progress with fatal rapidity. Thus the slightest bronchitis is often sufficient to awaken, in a manner, the process of tuberculisation, and to give it an unusual degree of activity. Thus some persons seem to carry about with them the germs of pulmonary phthisis; but it is as yet indicated only by slight symptoms, and does not perceptibly make progress. An eruptive fever supervenes; a gastro-intestinal inflammation declares itself; and after these diseases well-marked symptoms of pulmonary phthisis appear.

It has been said that under the influence of pregnancy pulmonary tubercles generally becomes stationary: this fact which we are far from denying, is not in accordance with what we have observed in nine women who were pregnant and evidently consumptive. In five of them the affection of the lung did not appear to us to have been influenced either favourably or unfavourably by the state of pregnancy; in the remaining four, the phthisis, which was but very little advanced at the time when the first signs of pregnancy manifested themselves, attained its last stage during the continuance of the latter; two of these last women died before they lay in, and the other two a little time after. We do not, however, mean to draw any general conclusion from this small number of particular facts.

CHAPTER V.

CICATRISATION OF TUBERCULOUS EXCAVATIONS OF THE LUNG.

143. Tubercles, when once developed in the pulmonary parenchyma, tend in the majority of cases to become softened, and to make an exit for themselves through the bronchi, leaving behind an excavation of greater or less size, which enlarges by uniting with others. Most frequently these cavities give no indication of a tendency to an approximation of their parietes; the purulent secretion, of which they are the seat, is a powerful cause of the exhaustion of the patient, and at the end of a longer or shorter time, death is the result of their presence in the pulmonary parenchyma. Such is the most general case, that which has been so well described by several modern writers, and on which, consequently, we consider it superfluous to dwell. But in these latter times Laennec has announced that tuberculous excavations of the lung were susceptible of cure, by means of a process of cicatrisation more or less analogous to that which several abscesses, ulcers, or other solutions of continuity present. However, notwithstanding the valuable observations on this subject, published by Laennec, the reality of the cicatrisation of pulmonary cavities is denied by several physicians, or at least placed by them among the number of phenomena not yet sufficiently ascertained. We deem it, therefore, useful to make known the result of our observations on this point. We shall first cite some particular facts; we shall then endeavour to give them that interpretation which we shall consider the most just; whatever may befal the latter, the facts themselves shall not be lost to science.

A. A woman, fifty years of age, died with all the symptoms of pulmonary phthisis. The upper and middle lobes of the right lung presented a red induration, with an admixture of a black colouring under the form of dots, spots,

or sinuous lines. In the midst of this indurated tissue there were found some crude tubercles by no means of a large size, and still further, five or six large cavities full of grumous pus, and which probably resulted from the discharge and evacuation of tuberculous masses. The left lung at first seemed healthy through all its extent; however, entirely at its apex, in a space which could scarcely contain a nut, there was observed externally a black colour, great hardness, and evidently puckering. Two large bronchi advanced towards this point and opened into a small oblong cavity, with smooth parietes, which could scarcely hold a hazel-nut. The inner surface of this cavity, which was filled by a liquid resembling serum, was lined by a dense cellulo-fibrous membrane; around it the pulmonary parenchyma was black and hard to the extent already mentioned; immediately above it there was a visible puckering externally.

The cavity just described seemed to be only the remainder of a larger cavity, as appeared to be fully proved: 1st, by the kind of depression which the lung had suffered above it; 2dly, by the manifest want of correspondence between the diameter of the cavity and that of the bronchi which opened into it. We may also remark that this cavity was situated where tuberculous excavations are most usually met.

B. In a man, fifty-two years of age, the two lungs contained a great number of crude or softened tubercles; the apex of the right lung was hard, black, and puckered externally. On cutting into it, we found at the distance of some lines from its surface an irregularly rounded cavity, large enough to contain a walnut, communicating by a short fistulous opening with a second cavity of a smaller size and crossed by a small band. Both were filled with a sort of reddish serum. To the extent of some lines around these cavities there existed a white homogeneous tissue which was really cartilaginous, and which constituted their parietes. These parietes were also lined by an extremely thin and fine membrane. But what was particularly remarkable, was that three large bronchi proceeded towards the cartilaginous tissue which we have just described; as soon as they arrived there they became entirely obliterated, and seemed confounded with it. A fourth bronchus, having reached the level of the cavities, diminished in size, and then consisted merely of a small canal which opened into the larger of these cavities, whilst the remainder of the bronchus seemed to be in a manner lost in the accidental cartilaginous tissue.

Here we find the same circumstances as in the preceding case, and also an anfractuous form of the cavities, as that of most tuberculous excavations, a cartilaginous tissue of new formation developed around them, and further, what is an important circumstance, five bronchial tubes, of considerable diameter, converging towards two small cavities, and becoming in a great measure obliterated in the cartilaginous tissue surrounding the latter. Here, then, is it not extremely probable that at a period more or less remote from that at which we examined the lung, all these cavities had communicated with one or more large cavities, which had gradually diminished, leaving behind, as a trace of their existence — 1st, the two small cavities described; 2dly, a cartilaginous tissue of new formation?

C. A man, about forty years of age died of acute pneumonia. The greatest portion of the right lung was in a state of purulent infiltration. Towards the upper part of the lower lobe of this lung, there was a part where the pulmonary parenchyma was replaced by a white tissue of a fibro-cartilaginous appearance. This accidental tissue occupied a space, the great diameter of which was in a direction perpendicular to the axis of the body; it was about two inches and a half in length and two in breadth; it was closely continued on all sides with the tissue of the lung, except in one point, where it was separated from it by a small oval cavity, occupying less space than the accidental tissue, filled with a purulent matter. Into this point of the lung a large bronchus entered, which

proceeded almost directly from the principal bronchial trunk of the lower lobe of the right lung. This bronchus having arrived at the cartilaginous mass partly disappeared, and communicated by the remainder of the canal with the small cavity interposed between a point of the cartilaginous tissue and the parenchyma of the lung. There was no trace of tubercle in the remainder of the lungs.

It may be presumed that if this patient had lived a longer time, the cartilaginous mass would ultimately have taken entire possession of the cavity filled with pus, of which it is probable that we now saw no more than a residue.

D. In another individual whose lungs contained tubercles in different stages, we found in one of the upper lobes a production which was also of a cartilaginous nature, but without any trace of cavity either around it (*C*), or at its centre (*B*). This production presented its great diameter in the direction of the height of the lung: it was about three inches long, and five or six lines in breadth. A large bronchus having reached this cartilaginous mass, suddenly became obliterated at the moment it arrived there, and was confounded with it.

In this latter case, the form of the bronchus was the only sign which led us to admit that a cavity had existed where we now found a cartilaginous mass.

E. Instead of a cartilaginous mass, we found in one case only a mere line, a sort of fibrous intersection; in another case, only a sort of lamina of the same nature, towards which several considerable bronchi also proceeded; when they had reached the point where the accidental tissue existed, their calibre disappeared and they became confounded with it.

This case is entirely identical with the preceding (*D*). The only difference is the form of the accidental production.

F. In lungs which presented several traces of chronic inflammation, with or without the existence of tubercles, we found masses, cellulo-fibrous, fibrous, and cartilaginous intersections, similar to that already mentioned, but differing considerably from it in this, that there were no longer seen bronchial branches becoming confounded with them. Now, in consequence of the absence of this latter circumstance, we cannot draw the same conclusions from the presence of these accidental productions; there is no longer any thing to induce us to suppose that they occupy the place of a cavity, and we may in this case very well admit that they are of a primary formation, just as tubercle or melanosis are formed. In the lungs of horses we have sometimes met similar fibrous or cartilaginous masses, and in them nothing proved, or even inclined us to suspect, that they had replaced a cavity. In several cases, also, these productions have a seat, which it is easy to determine in man, but more particularly in the horse. It is not in the parenchyma itself of the lobules that they are most usually situated, but rather in the interlobular cellular tissue. One may even follow their gradual formation in the latter. Thus in some cases the cellular tissue is merely thickened; it is then more dense and more apparent than in the normal state: the pulmonary lobules are separated from each other by white or grey intersections. In another stage, these intersections exhibit an appearance manifestly fibrous; at other times, in fine, they continually become broader, and from mere lines which they were at first, they gradually form more or less regular masses, fibrous or cartilaginous, which then compress the pulmonary lobules.

G. A man, twenty-four years of age, seemingly in the last stage of phthisis, died two days after his admission.

The two lungs were filled with crude or softened tubercles. Also the apex of the right lung was hard and wrinkled externally, and as it were depressed. When cut into at this point, its tissue presented several black masses, in the centre of which were tubercles of the consistence of plaster. Large bronchi were converging from different points towards this part; and the moment they plunged into the melanosed substance, their calibre became suddenly con-

tracted, their cavity was obliterated, and they seemed to be changed into ligamentous cords.

In this case, as in the preceding, we perceive large bronchi terminating abruptly, by the obliteration of their cavity, in portions of the lung for a long time impervious to air. But, instead of the cartilaginous productions, we now only found some cretaceous tubercles, with black induration around them. We have already mentioned in another article how this sort of tubercle might be considered; several facts then inclined us to admit that their existence announced in a greater number of cases the diminution of the size of the tubercles, or at least a stationary condition of these bodies. The coincidence which we here remark between the abrupt obliteration of the bronchial tubes, and the existence of these plaster-like concretions, does it not again strengthen our opinion with regard to the nature of the latter, an opinion which was also entertained by Laennec?

H. In a woman, fifty years of age, we found the following lesions in the lungs: —

Right lung. — A large bronchus coming almost directly from the principal bronchial division of this side, opened into a small cavity lodged in the upper lobe. This cavity, with thin, transparent parietes, of a texture almost analogous to those of the bronchial parietes, was occupied by a cartilaginous, roughened concretion, which was free in this cavity. This mass of cartilages had been at first probably united to the pulmonary parenchyma, from which it was afterwards separated. At a subsequent period it might have been discharged by expectoration, and the parietes of the cavity containing it might have approximated.

Entirely at the apex of this same lung, in the midst of a very hard, brownish, grey tissue, there existed two small cavities, each capable of containing a nut, communicating by a short fistulous passage, and traversed in different directions by thin and reddish bands. Their parietes were lined by a very fine membrane, which was also reddish, and of a cellulo-serous appearance. One of these cavities communicated with a large bronchus. The apex of this same lung presented bands, and a manifest depression.

Left lung. — Its upper lobe was also indurated with an admixture of grey, brown, and black matter. In this lobe there existed an oblong cartilaginous production, somewhat resembling, in form and size, that already described (*D*). A bronchus reached it, and was abruptly obliterated. Not far from this production there existed a small rounded cavity, the parietes of which were formed of a cartilaginous membrane, several lines in thickness; a large bronchus opened into it. In this same lobe, entirely at the apex, a considerable bronchus terminated in a *cul-de-sac* in the midst of an indurated tissue, without any other accidental production. Was there here only mere dilatation of a bronchus?

Finally, in the interior of the left lung, there were scattered several small rounded masses, of a cartilaginous nature, which had no apparent connexion with the bronchi.

This last case is remarkable, as it presents a combination of most of the lesions which each of the preceding cases showed to us separately; it also exhibits to us the existence of a free cartilaginous concretion in the midst of a cavity into which a bronchus opened.

From the aggregate of the facts now cited, the result appears to us to be that accidental cavities of a greater or less size, having existed at a certain period in the pulmonary parenchyma, these cavities may sometimes diminish imperceptibly, and even be completely obliterated. The circumstances of this obliteration have been very well described by Laennec; our observations are only confirmatory of his. The obliteration of these cavities being well ascertained,

it may be asked whether they were tuberculous excavations. Now, to this question an answer may be given in the affirmative: 1st, because in almost all the cases, the only cavities met in the pulmonary parenchyma are the result of softened tubercles; — 2dly, because almost in all the cases where are found in the lung traces of diminution there or obliteration of a cavity, there were at the same time tubercles, either in the same lung, or in the other (*A*); 3dly, lastly, because in the cases even wherein the latter were not met, that is probably a further reason for admitting a more easy obliteration of a tuberculous excavation previously existing. It is readily conceived that the latter must tend more naturally to cease secreting pus (a cessation which is the first condition of cicatrisation), in cases where the cause which previously produced the tubercle, to which it succeeded, seems no longer to act, or at least no longer manifests its action by the formation of other tubercles. Besides, it is beyond dispute that in certain cases there has been found but one single tubercle in the entire of the two lungs. Recently, again, on opening the body of a woman now advanced in years, we met, towards the base of the upper lobe of one of the lungs, near its surface, a single tubercle which was nearly the size of a large nut. Around it the pulmonary parenchyma was healthy.

Whilst we admit that tuberculous excavations may cicatrise, we own that in the great majority of cases this cicatrisation is scarcely of any use to the patients, in consequence of the simultaneous existence of a great number of other tubercles. The obliteration of a cavity can only be advantageous in the case where there was but one tubercle, as we have already instanced; or if, consecutively on the cicatrisation of the cavern, the other tubercles existing in small numbers, and surrounded by a healthy parenchyma, remained stationary in their development. We must not then confound the certain cure of a single tubercle by cicatrisation of a cavity with the cure of the tuberculous affection itself.

In speaking of the progress of pulmonary phthisis, we already cited cases in which are traced the signs by means of which it is possible to ascertain during life that a tuberculous excavation is progressing towards cicatrisation (138).

There are cases, moreover, in which the consideration of the symptoms has been capable of throwing great light on the question before us. We have seen persons who, after having presented all the rational signs of pulmonary phthisis, have yet returned to a good state of health, and in whom the examination of the body demonstrated the existence of some of the states of the lung which we have just passed in review. We shall, in particular, cite the following case: —

A woman died at the age of forty, of a cancerous affection of the stomach. Several years she had all the symptoms of pulmonary phthisis, which brought her life into very imminent danger. However, contrary to the expectation of her physicians, these symptoms gradually disappeared, and her cough entirely left her. During the following years the affection of the stomach began to increase, but she had no cough, and during the last year of her life she presented no symptoms of pulmonary disease. At the autopsy a cancer was found in the stomach.

The lungs were sound through nearly all their extent; their apex adhered to the ribs; they both presented at this part a blackish colour, and remarkable puckering. The apex of the right lung, when cut into, presented beneath the pleura, and to a small extent, an induration of a dark grey colour; immediately beneath this induration, there existed a body of a rounded form, of a cretaceous consistence, adhering on all sides to the parenchyma, which was healthy around it. Near this body, and confounded with the pulmonary induration, there appeared two small tuberculous masses extremely friable and dry.

At the apex of the left lung there was found an induration similar to that of

the right lung, with respect to extent and colour; in the midst of the indurated portion there was seen a small quantity of hard tuberculous matter, friable, and contained in a cavity. There was no cretaceous tubercle, properly so called, as on the right.

From this fact several important consequences may be drawn. It proves, first, that a black induration of small extent in the pulmonary parenchyma, with a cretaceous tubercle in the midst of them, may exist without occasioning cough or dyspnœa. But if we go back to the previous circumstances, we shall be led to consider this state of the lung as a vestige of the very serious pulmonary affection which occurred in the patient some years before. It seems to us extremely probable, that where a cretaceous tubercle was found with black induration around it, a much larger tuberculous mass had formerly existed, which, either at the period of its formation, or during the time of its softening, had occasioned the symptoms of phthisis observed in the patient. Whether this mass was afterwards absorbed or evacuated, the cavity which it occupied, collapsing on itself, produced the puckering of the apex of the lung; what remained of this cavity was in some measure moulded on a debris of tubercles which had already undergone a remarkable modification in its physical properties, and which became changed into a calculous concretion.

SECTION IV.

OBSERVATIONS ON DIFFERENT ACCIDENTAL PRODUCTIONS DEVELOPED IN THE LUNG.

When treating in the preceding section of pulmonary phthisis, I had occasion to speak of several of the species of phthisis admitted by Bayle; thus I cited some cases regarding phthisis with melanosis, granular phthisis, and calculous phthisis. Bayle also admitted a phthisis produced by the development of cancerous masses within the pulmonary parenchyma. I have also often found scirrhous and encephaloid productions in the lung; but what struck me in the cases of this kind, which I had an opportunity of observing, is, that other similar productions existed at the same time in other parts of the body, so that in these cases the pulmonary lesion itself had not acted the sole part in the production of the symptoms; no characteristic sign had even revealed it amidst the numerous morbid phenomena, which revealed the simultaneous suffering of several organs. The following is a case of this kind: —

Case 1.—Cancerous masses developed in several organs, and in the lung in particular.

A man, twenty-five years of age, had been for a long time complaining of wandering pains in the limbs, which afterwards settled in the lumbar region. He stated that for nearly a year he was troubled with pains in this region, which increased by walking, by flexing the trunk laterally and forwards, and by mere pressure. These were removed by a large blister applied over the lumbar region. About two months after he began to feel wandering and temporary pains in the abdomen, and great constipation: borborygmi also, nausea, and eructations annoyed him very much. This was in the beginning of January. Towards April there was perceived a tumour to the left of the xiphoid cartilage; this was not painful except when considerable pressure was made on it. The other symptoms already mentioned still continued to torment him: he entered the La Charité in the middle of July, and presented the following state: —

Countenance pale; expression of the face natural; muscular strength still retained. The abdominal parietes formed a remarkable prominence to the left of the xiphoid cartilage. There was a hard tumour here; the colour of the skin over it not changed; painful on a little pressure; it extended into the left hypochondrium, and beneath the false ribs of this side, and was continued downwards to within two or three fingers' breadth of the umbilicus, presenting a smooth surface, and an irregularly rounded form.

The ingestion of food not painful; frequent eructations; continual gurgling noise in the belly, principally near the tumour. Obstinate constipation; urine scanty and red, passed with difficulty, and occasioning acute pain in the urethra. The state of this patient continually became worse. The obstinate constipation required the frequent administration of lavements. He died the 20th of August.

Post-mortem. Emaciation extreme: the tumour in the left hypochondrium very perceptible. On opening the abdomen, the entire intestinal mass was observed to be of a brownish colour, and a small quantity of serum in the cavity of the peritoneum. Immediately beneath the cartilages of the false ribs of the left side, behind the splenic tuberosity of the stomach, which was pushed forward, there was a large, hard, regularly formed tumour; it occupied the anterior and left part of the vertebral column, touched the kidney of this side, and passed down nearly as far as the bifurcation of the aorta. Anteriorly, superiorly, and inferiorly, it had the stomach, and arch of the colon, which it raised; still lower down the small intestines, which concealed it from view: on the left the kidney was in contact with it. When cut into, this tumour presented a tissue not very opaque, whence flowed, by pressure, an ichorous serum: it was marked by a number of small red vessels. In the midst of the still hard tissue (crude encephaloid matter), there existed small masses of a yellowish white colour, friable, devoid of cohesion (tuberculous matter). In other parts the tumour entirely softened, presented a substance in every respect resembling in appearance a fœtal brain, in which putrefaction is now commencing. This greyish, inodorous detritus was mixed here and there with effused blood (softened and encephaloid matter).

On raising the splenic end of the stomach to look for the spleen, we found an immense pouch, containing a great quantity of liquid blood, like wine lees. When the parietes of the pouch were carefully washed out, they were found to consist of the same sort of substance as the preceding tumour; this pouch being, in fact, an analogous tumour, but more advanced, and softened to a considerable extent. In the transverse fissure of the liver, a third tumour, similar to the preceding, was found. But here the very tissue of this viscus was attacked, and changed into a softened encephaloid substance over a great part of its right lobe. The mesentery contained several lymphatic ganglia hard and diseased. In the urethra the verumontanum was found more prominent than usual: it was hard and schirrous. Two large masses were found in the right testicle.

Chest. Left ventricle of the heart hypertrophied. At the apex of both lungs a cancerous mass was found, resembling in every respect the tumours in the abdomen, presenting the encephaloid tissue in its two states of crudity and softening, mixed with some tuberculous matter. There two masses were about the size of an apple. They seemed to be developed between the pleura and the lung, the tissue of which did not appear to be at all engorged at this part. Over all the external surface of the two lungs, similar tumours were observed, but smaller in size. In the interior of the lung, cancerous masses were also discovered. Five or six were found in each lung. The size of each was about that of a chestnut. They were evidently formed of encephaloid tissue, hard in some points, and commencing to be softened in others.

We shall now cite a few cases where we found another species of morbid product in the lung, namely, hydatids.

144. The cases of hydatids observed in the human lung are still few in number. We thought, therefore, that in a work, the principal purport of which was to collect materials for science, we should detail the small number of facts relative to pulmonary hydatids, which we have observed at the Charité. In so doing we shall be mere narrators; science does not yet appear sufficiently advanced for us to attempt to establish the etiology of this kind of production, either in the lung, or elsewhere. We desire only to add some facts to those which are already possessed.

Out of about six thousand patients admitted into the wards of M. Lerminier, during the last six years, we saw hydatids developed in the lung only five times, and it must be observed that in one of these five cases it was only from the symptoms that the diagnosis was established. The only hydatids which we met in the lung was acephalocysts. In these cases they were found to be in a cavity in the middle of the pulmonary parenchyma; in a fourth case they filled the pulmonary veins. In the fifth case their particular seat could not be ascertained, death not having taken place.

In one of these cases the acephalocysts were developed in a lung full of tubercles, and their existence was not revealed by any characteristic sign. In two other cases they constituted the only affection of which the lung was the seat, and they produced in one of these two cases the symptoms of a double chronic pneumonia; in the other the lungs did not appear the seat of any lesion during life. Lastly, in the patient in whose pulmonary veins the acephalocysts were found, no other symptoms were observed, except those of an organic affection of the heart, which really did exist.

Thus in none of these cases did the hydatids occasion any specific phenomenon which might serve at another time to make known their existence. This is, also, what is observed in hydatids developed in the different organs. These entozoaire may be produced and acquire considerable size without occasioning any pain, altering the general nutritive function, and without producing any other results than such as arise from their presence in an organ whose parenchyma may be more or less strongly compressed, without its functions being interfered with. Thus we have seen considerable hydatid cysts developed in the liver, without the health appearing to be in any way disturbed. We have also found some in the spleen, which had not been announced during life, by any symptom.

Case 2.—Acephalocysts in the lower lobe of the two lungs—Symptoms of chronic pneumonia.

A middle-aged man entered the hospital in a state of great emaciation. He had a cough for a long time, and his breathing was short. The chest when percussed, yielded a dull sound over nearly all the extent of the thoracic parietes, corresponding to the space occupied by the lower lobe of each lung. On both sides, also, over this same part, the respiratory murmur was not heard. This person died shortly after admission.

The lower lobe of each lung was changed into an immense pouch with thin parietes, constituted of the pulmonary parenchyma pressed back, and lined by a whitish fibro-cellular membrane. Each of these pouches was occupied by a large acephalocyst, which contained two or three other small ones. This hydatid was filled as usual by a colourless liquid, as clear as rock water.

The presence of these hydatids in both lungs, the pressure made by them on the pulmonary parenchyma, clearly account for the symptoms during life.

Case 3.—Acephalocysts developed in a lung filled with tubercles, and at the same time in the liver—Symptoms of phthisis.

The subject of this case died with all the symptoms of phthisis: a great number of tubercles were found in both lungs in different states. On cutting into the middle part of the lower lobe of the left lung, there was observed to flow over the two sides of the blade of the scalpel a purulent, greenish liquid, of some consistence, very different from the matter usually filling tuberculous cavities; it resembled the pus of a phlegmonous abscess. This flowed from a cavity in the middle of the pulmonary parenchyma, large enough to hold a nut. Its parietes, formed of the tissue of the compressed lung, were lined by a layer of concrete pus.—This cavity was entirely filled by a single acephalocyst, which was free in it on all sides.

On the upper surface of the right lobe of the liver, near the insertion of its suspensory ligament, a white spot was observed about twice the size of a five franc piece. This was found to contain a transparent and colourless liquid, like spring water, contained in an acephalocyst, like that of the lung.

Case 4.—Acephalocysts in the lower lobe of the right lung—Respiratory murmur stronger on this side; no other sign of a pulmonary affection.

A woman, forty-five years of age, died of cancer of uterus. During the last two months of her life she presented no symptom of pulmonary disease. The respiratory murmur was louder in the right lung than in the left; this inequality of the respiratory murmur was sufficiently striking to attract our attention. We were at a loss to know whether the alteration existed on the side of the chest where the respiration was weaker, or on the other. The *post-mortem* showed us in the right lung, that in which the respiratory murmur was loudest, an acephalocyst, the size of a large nut, which contained several other smaller ones.

A sort of supplementary respiration appeared to have been set up in the lung of this patient, as a small portion of it being pressed on by the hydatid cyst had become impervious to air, or probably there existed here a shade of the bronchial respiration.

Case 5.—Acephalocysts in the pulmonary veins—Aneurism of the heart.

A man, about fifty-five years of age, had been badly fed for the year previous to his entering the hospital, and had been suffering under great mental distress. During his stay in the hospital he presented nothing but the ordinary symptoms of an affection of the heart; its pulsations were loud, but without impulsion, all along the sternum and under the two clavicles; pulse natural; face swollen and violet-coloured; infiltration of the limbs; orthopnœa; over several points of the chest some moist bronchial rale was heard, and in other points total absence of respiration; the dyspnœa, however, increased, and he died in a state of asphyxia.

The two lungs were filled with hydatids. We thought at first that they were seated in the parenchyma itself; but a more careful dissection revealed to us a fact which has but few like it in the annals of science, namely, the existence of hydatids in the pulmonary veins.

Several of these were lodged in pouches with a smooth surface, which at first seemed to be so many cysts. Others of them, empty and rolled several times on themselves, were contained in narrow canals, the elongated form of which they assumed. The inner surface of these canals was smooth, like that of the great pouches; they ramified like vessels. We soon ascertained that at each pouch a vessel terminated, of small calibre, which to form it underwent greater or less dilatation. We then dissected the pulmonary veins at their entrance into the heart, and we traced them into the lung; when we had come to their

almost capillary divisions, we began to perceive several of them present a considerable number of enlargements which were filled with hydatids. After being thus dilated, the vein resumed its original calibre; then, a little further on, it was again dilated. The largest of the pouches might have contained a large nut, and the smallest would admit a pea. They existed equally in both lungs. The hydatids which they contained had all the characters of acephalocysts; several presented small points of a dull white colour in their substance; others presented on their inner surface a great number of miliary granulations. Most of them were burst. Around them the pulmonary tissue was in several points healthy and crepitating; in other points it was infarcted and even hepatised.

A vast hydatiferous cyst with cartilaginous parietes, capable of containing a large orange, was found in the liver; eight or ten acephalocysts were included within it. This is the second time we detected the simultaneous existence of hydatids in the liver and in the lung.

The right cavities of the heart were considerably dilated, and the parietes of the right ventricle a little hypertrophied.

The presence of so great a number of hydatids in the pulmonary veins must necessarily have occasioned considerable embarrassment to the circulation. Did it contribute to the great dilatation of the right cavities of the heart?

Case 6.—The debris of acephalocysts expectorated—Hemoptysis.

A man, twenty-eight years of age, had a cough now four months, when he entered the Charité. Since then he had several attacks of hemoptysis; he felt an habitual pain beneath the left breast. We found him in the following state: —

Countenance pale; breathing short; cannot lie on the left side on account of the pain. Cough frequent; sputa consisting of an opaque and greenish mucus; resonance of the chest equal in all points; bronchial rale posteriorly on both sides; apyrexia. There was every reason to apprehend here the existence of pulmonary tubercles. The third day of his admission he expectorated a large fragment of membrane rolled on itself, having the characteristic appearance of the tissue of acephalocysts. This membrane, when unrolled, was nearly the size of the palm of the hand. Thus it is evident that it was not formed in the bronchi. It could come only from a tuberculous cavity, or from a cavity inclosing an hydatid cyst, of which the preceding cases afforded us instances. The latter opinion seemed the more probable. On the following days the patient spit a considerable quantity of blood; copious venesection was employed and the hemoptysis ceased, and the patient, finding himself better, wished to leave the hospital.

This case may be added to those contained in authors on the expectoration or hydatids. It is easily conceived that their total expulsion may be followed by a cure, provided the disposition which gave rise to them may not reproduce others, and that they are not complicated with any other affection of the lung, as was the case of the individual who formed the subject of our third observation, and provided also that the cavity which lodged the hydatids, instead of becoming obliterated after the expulsion of the latter, is not transformed into an incurable ulcer, a thing which is possible.

SECTION V.

OBSERVATIONS ON PLEURITIS.

145. It is more usual to meet pleuritis alone, without being complicated with pneumonia, than to meet pneumonia without pleuritis: the latter case is so rare

that we thought it right to designate by the generic term, pleuro-pneumonia, all the inflammations of the pulmonary parenchyma, of which we have given examples in the preceding part. On the contrary, the diseases of which we shall treat in this section shall be all cases of pleuritis not complicated with pneumonia. For the rare cases where this complication shall exist, we shall adopt the term *pneumo-pleuritis*. Many ages have been necessary in order to acquire the simple and accurate ideas now possessed regarding the nature and seat of pleuritis; truth seemed in this case so easily found, that one can scarcely conceive how this affection could be the object of such long and such interminable discussions. In vain did Aretæus, emulated by Paulus of Ægina, and Alexander of Tralles, assign to pleuritis its real seat; their successors, little versed in the cultivation of anatomy, returned to the ancient opinion of Hippocrates; they confounded inflammation of the pleuræ with that of the pulmonary parenchyma, and often attributed to one of these diseases that which belonged exclusively to the other. Thus the rust-coloured and viscid sputa of pneumonia were for a long time considered as equally characterising pleuritis. Up to a period very near our own time, physicians are seen to be uncertain whether the acute pungent pain of pleuritis is not rather the result of inflammation of the pulmonary tissue; and yet, many ages before, Aretæus had positively stated that the pain, very acute in pleuritis, is none in pneumonia. The possibility of separate inflammation of the lung and its investing membrane was a long time doubted; and after sharp discussions this possibility was only well established by the observations of Diemerbrock and Frederic Hoffman. If we run through the *Sepulchretum Anatomicum* of Bonet, we shall be surprised at the crowd of strange ideas and erroneous opinions regarding the nature, causes, and effects of adhesions of the pleura. The physicians contemporary with Morgagni placed these adhesions among the causes of sudden death, and this great man dedicated a considerable portion of his immortal work to refute this error, which was already combated by the systematic Van Helmont. This latter physician entertained such incorrect ideas regarding the nature of pleuritis, that he considered bleeding a fatal remedy in this disease. It is known that this celebrated enemy of bloodletting seems himself to have died of an effusion into the pleura, in consequence of a pleuritis which he refused to combat by bleeding. Almost in our own times, Stoll, who shed such a light over the diagnosis of latent pleuro-pneumonia, appears not to have had ideas always clear and precise regarding the symptoms of pleuritis. This inflammation, as all those of serous membranes, has been accurately understood only since the birth of general anatomy. Several contemporaneous authors have already published a great number of accurate observations calculated to throw considerable light on the diagnosis of pleuritis. What physician has not read with advantage the valuable observations on this subject, contained in M. Broussais' *Traité des Phlegmasies Chroniques?* What physician has not also studied the still more accurate observations on chronic pleuritis, published by Bayle in his classic work on pulmonary phthisis? But since the publication of these works and several others, the bounds of science have been extended; the diagnosis of pleuritis, as that of all diseases of the chest, has been very much modified, illustrated, and perfected by the immortal discovery of the method of auscultation. Science in its present state seems then to call for new observations, which, tracing with exactness the symptoms of pleuritis according to the new means of exploring it, may confirm or invalidate the utility of these latter, and thus supply the deficiencies which must necessarily be presented by the observations on pleuritis published before Laennec's work. Such is the object of the cases and observations contained in this section.

The most striking difference existing between cases of pleuritis consists in the presence or absence of effusion. Pleuritis without effusion, not severe

unless when very extensive, already received our attention when we spoke of pneumonia, this latter affection being almost always preceded or accompanied by an inflammation of the pleura, which very rarely terminates in effusion. We shall give here but a very few cases of this *dry* pleuritis, if I may so call it. We shall then run through the different varieties which pleuritis with a collection of fluid presents, according as it is acute or chronic, manifest or latent, limited to one side or extended to the two pleuræ, general or partial, simple or complicated.

CHAPTER I.

PLEURITIS WITHOUT EFFUSION.

Case 1. — A mason, twenty-nine years of age, of a strong constitution, and always in the enjoyment of good health, felt a shivering on the morning of April 10th; the remainder of the day he was ill, yet continued his work as usual. In the night he was seized with an acute pain of the side below the right breast; the next day he coughed without expectorating; pain increased by deep inspirations. On the evening of the twelfth, he was taken into the hospital and bled, and the following day he presented the following state: —

Face flushed; lies on his back; acute pain below the right breast, increased by cough, by the inspiratory movements, by percussion, and by intercostal pressure; cough frequent and short; expectoration that of acute bronchitis; breathing calm enough in the horizontal position, but short and panting when the patient sits up; percussion on every part sonorous; respiratory murmur in general weaker on the right than on the left; pulse hard, and of moderate frequency; skin hot and dry (this dryness observed from the onset). Tongue natural, thirst, abdomen free from pain, constipation. (Bleeding to twelve ounces; fifteen leeches to the side affected.) Blood cupped, and covered with a thick buffy coat, surrounded with a great quantity of serum.

Fifth day: the pleuritic pain no longer felt, except on making deep inspirations; the respiratory murmur heard equally well in every part; pulse still frequent, no perspiration; venesection to eight ounces prescribed; it presented but a very thin buffy coat, covering a large clot.

Sixth day: the pleuritic pain entirely gone; the patient sweated during the night for the first time: scarcely any cough, fever gone; and on the following day he was quite well.

This case presents, in a manner, the type of slight pleuritis without effusion. All the symptoms characteristic of this disease were found here combined; namely, the pain of side preceded by shivering, the cough, without any other expectoration save that of catarrh; the sonorousness of the thoracic parietes still retained; the respiratory murmur weaker on the affected side, in consequence of the unequal dilatation of the thorax; fever, with hardness of the pulse; and, lastly, the buffy appearance of the blood. With respect to the mode of lying in the bed, it was not such as is mentioned in all authors; it was on the back, and not on the side opposite to the seat of the pleuritis. The skin remained constantly dry up to the moment when an amendment took place; then perspiration came on. The crisis came before the sixth day. The active antiphlogistic treatment employed exercised, no doubt, a powerful influence on this prompt and favourable termination. However slight cases of pleuritis may be, they should be attacked from their onset by copious bloodletting. If influ-

enced by the mildness of the present symptoms, we meet the disease by a treatment not sufficiently active, we have too often occasion to repent of it, either because an effusion supervenes, or the inflammation of the pleura, from having been neglected, extends to the pulmonary parenchyma.

Case 2. — A woman was employed in washing linen, at a river, for several successive days during the month of February, in consequence of which she was seized with an acute pain below the right mamma; on the third day she entered the hospital. She then breathed with difficulty; inspirations short, as if arrested by the pain; the latter, very acute, was also increased by motion, percussion, and cough; expectoration none; pulse frequent and hard; skin burning and dry. The respiratory murmur a little weaker on the right side. (She was bled, and leeches were applied to the affected side.)

On the fourth day the breathing was somewhat more free, and the pain less; in other respects her state was the same. On the morning of the fifth day, the dyspnœa and pain were considerably increased; no sign had yet announced that effusion had commenced into the pleura. The patient was in a state of great anxiety; she complained of a weight and burning heat in the lumbar and inguinal regions. She was bled again; we scarcely left her when she was attacked with profuse uterine hemorrhage. According as the blood flowed, the patient found herself evidently relieved. She lost a considerable quantity of blood. In the afternoon the breathing became free, the pain was diminished and the pulse was almost natural; in a word, this woman had passed in a few hours from a very alarming state to a state of convalescence. She soon recovered.

The most remarkable circumstance in this case is the manner in which the disease terminated. We find but few instances in authors of uterine hemorrhage proving so critical. Before its appearance, an evident exasperation in all the symptoms was observed, and scarcely had the hemorrhage set in when an evident amendment was perceived. Care should be taken not to confound uterine hemorrhage of this sort, which are truly critical, with the simple menstrual flux, which has been often considered as bringing on a crisis in several diseases. It is evident that in most cases this discharge does not appear till after the crisis is already established. Again, in many affections it is not the suppression of the menses that cause the morbid state, but it is the latter which suppresses the menses. — Thence the inutility of endeavouring to bring on the menses as long as this morbid state continues. This is observed, for instance, in pulmonary phthisis.

CHAPTER II.

PLEURITIS WITH EFFUSION.

Case 3. — A mason, thirty-six years of age, felt, without any known cause, general illness. This was on March 21st. In the course of this night he was seized with an acute stitch in the side, below the right breast. On the 23d he had some cough, and on the 24th he kept his bed, and entered the Charité on the evening of the 25th. There was then great dyspnœa; he could not inspire without feeling acute pain on the right side, which pain was also increased by percussion and coughing. The chest, when percussed, sounded less perfectly on the right side posteriorly; on this part, also, the respiratory murmur was very weak, and the patient's voice presented a sort of tremor (*chevrotement*), not to be found in the other parts of the chest. The cough was very

frequent, and without any expectoration, pulse feverish, skin hot and dry. (Twenty-four leeches were applied to the right side of the chest.)

The next day a very remarkable amendment took place ; the breathing, much less embarrassed, was heard equally distinct in every part. On the right there was neither dulness of sound, nor tremor of the voice. The pleuritic pain was now very inconsiderable. There could be no doubt but that the slight effusion which existed in the right pleura was absorbed. No sweat, nor any other critical phenomenon had taken place. However, the pulse retained its frequency. This symptom, and the dull pain which still continued, seemed to announce that the resolution of the inflammation was not yet complete. (Twenty leeches more applied to the side.)

On the night of the 26th, profuse sweat for the first time. In a few days more he was perfectly convalescent.

This disease marks in some degree the transition of pleuritis without effusion to pleuritis with effusion. Undoubted signs announced the existence of a collection of liquid in the pleura ; this collection was not considerable ; there was rather a diminution in the sonorousness of the chest than positive dulness of sound ; the respiratory murmur was still heard, though weaker, and there was evident ægophony. Under the influence of one application of leeches, the inflammation retrograded, and in twenty-four hours the effusion was absorbed. Still the inflammation was not completely resolved before the sixth or seventh day, and after the appearance of a profuse sweat. It was then only the pulse lost its frequency.

Case 4. — A servant man, twenty-four years of age, of rather delicate frame, residing in Paris only for the last six weeks, felt, on the 16th of March, 1822, without any known cause, a pain in the side, under the left breast. This continued for the following days : he did not pay any attention to it, and continued his usual occupation till the 22d. Then the pain was become more acute, cough dry, great oppression. On the 23d he entered the hospital, and was bled.

On the 24th countenance pale, expressive of great anxiety ; inspirations short and frequent oppression ; cough dry ; pain below the left breast increased by percussion, by intercostal pressure, by cough and inspiratory movements ; decubitus on the right side. Dull sound on the left posteriorly and laterally ; respiratory murmur none, where the sound was dull ; weak on the left anteriorly, very loud every where else ; no ægophony. Pulse of moderate frequency ; sweat general over the body ; tongue whitish ; constipation. This group of symptoms announced an effusion into the left pleura, which probably had commenced since the 22d ; it was now too great to allow ægophony to be heard. (Venesection to twelve ounces : twenty leeches to the left side. The blood flowed but slowly : it presented a large clot, not buffy.)

25th. Total disappearance of the pain of side ; decubitus on the back : his state the same in other respects. (Venesection to eight ounces ; purgative lavement, &c.)

26th. A large blister over the left side. — 27th. Breathing less embarrassed ; patient better ; ægophony heard for the first time on the left, on a level with the inferior angle of the scapula. A very great quantity of serum flowed all the day from the blistered part ; profuse sweat towards night.

From the 28th of March to the 4th of April, the ægophony continued ; the dulness of sound diminished, and the respiratory murmur began to be heard, but much weaker than on the right. The breathing appeared but little impeded ; pulse not frequent ; the general state very good. Sweats had taken place every night.

On the 4th of April the pulse no longer frequent ; was allowed a small

portion of food for the first time. On the day after, the breathing became more embarrassed, and the pulse more frequent: the allowance of food was discontinued; on the 6th every thing returned to the same state as it was on the 4th.

The night sweats now ceased, the strength returned, and the patient was soon able to get up and walk. After the 12th ægophony was no longer heard, and he now felt only a slight oppression. Sonorousness of the chest equal in every part; still the respiratory murmur was weaker on the left than on the right. Was it because there was still a little liquid effused, or was it that, by a sort of habit, the left side of the chest dilated less than the right? The patient left the hospital on the 28th of April.

The signs furnished by auscultation here announced, with great precision, the increase, then the diminution, and, finally, the total disappearance of the collection in the pleura. When we first saw the patient, the total absence of the respiratory murmur, the great dulness of sound, indicated that a great quantity of liquid was interposed between the thoracic parietes and the pulmonary parenchyma. Then, too, no ægophony was heard. At a later period we began to hear the respiration in the left side a little; the other symptoms indicated at the same time that the effusion was diminished; then some ægophony manifested itself. Finally, after the disappearance of the latter, and when every thing announced the entire absorption of the liquid, the respiratory murmur continued for some time weaker on the left than on the right.

The onset of the pleuritis in this case also merits our attention. The patient at first felt but a slight pain, unaccompanied by any other alarming symptom; it was after it had continued thus for some days that it suddenly became exasperated, and all the signs of real pleuritis developed themselves.

The sort of relapse which had been occasioned by allowing some nourishment to the patient, and that at a time when the absence of fever seemed to warrant it, points out the necessity of observing strict regimen as long as the inflammation, though diminished, still continues.

Case 5.—A currier, twenty-five years of age, of strong make, having a broad and well-developed chest, had always enjoyed good health. On the 12th of July, he felt a slight pain below the left breast, without any other morbid symptom. On the 13th, this pain was gone. From the 19th to the 24th, it appeared and disappeared without at all inconveniencing him, but on the 24th it returned with much more severity; at the same time there was cough and dyspnœa. These symptoms continued on the 25th and 26th. Eight leeches were applied to the side. He entered the Charité on the 27th, and on the 28th he presented the following state: —

Slight oppression; could lie indifferently on either side, but preferred to lie on his back, because in this position he coughed less. The pain no longer appeared except when he strove to cough, and in making deep inspirations. Cough dry; inspiratory movements short and frequent; pants a little when he speaks. Inferiorly on the left the sound was dull, and the respiratory murmur gone; no ægophony. Pulse frequent; skin hot and dry. (Twelve leeches to the left side.) On the 29th, same state. (Bled to twelve ounces.)

30th. Dyspnœa increased; extreme anxiety; the patient, lying on his back, complained of an insupportable weight which prevented the dilatation of the chest. On the left the sound was dull, both anteriorly and posteriorly, as far as the level of the third rib; on the right and left the respiratory murmur was distinctly heard only in the supra-spinous fossa, and immediately below the clavicle; lower down, on both sides, different varieties of the bronchial rale were heard (mucous rale in some points, sibilous or snoring rale in others). On the left, literally and posteriorly, we heard for the first time manifest ægophony;

fever still continued. (Thirty leeches to the left side; ptisan de violette gommée, &c.)

The patient felt great relief from the application of the leeches; the pain disappeared completely. In the night he had for the first time a profuse sweat; he coughed and expectorated much mucus; he slept tranquilly.

On the 31st, the breathing was much easier; pulse had but slight frequency. The patient, lying on the right side, expressed how much better he felt; the ægophony was no longer heard; the dulness, however, was not diminished; auscultation afforded the same signs.

On the 1st of August, the sound had returned anteriorly from the clavicle to the level of the breast, and posteriorly as far as the middle of the infra-spinous fossa. Over this same extent the respiratory murmur was distinct, but much weaker than on the right; lower down, as well anteriorly as posteriorly, the sound was very dull, and the respiratory murmur almost none; no trace of ægophony. The effusion, though evidently diminished, was still considerable, and still there was complete apyrexia; the oppression was very slight; rather severe fits of coughing, excited by the least motion, frequently tormented the patient. (Demulcent drinks, &c.)

The six days following, the condition of the chest remained stationary; however, the strength returned rapidly, the appetite was excellent; the apyrexia was complete during the day; but every evening the pulse became a little accelerated, and profuse sweats every night. The quantity of aliment was not increased.

On the 8th of August, a blister, six inches in diameter, was applied over the left side.

On the 10th, the ægophony was again heard. Up to the 19th the dulness of sound diminished progressively, and the respiratory murmur began to be heard a little over the left side. The general state was excellent. The patient felt no oppression; he no longer coughed, and thinking himself completely cured, he bore the blister very impatiently; a very small allowance of aliment was given him. On the 19th, the ægophony ceased to be heard, though the sound was still a little less on the left, and the respiratory murmur was weaker. We had considerable difficulty in preventing the patient from leaving the hospital at this time. It was not till the 26th of August that the equality of the sound, and of the respiratory murmur on both sides, indicated the complete absorption of the effusion. The blister was then allowed to heal, and the patient left the hospital.

The pleurisy was first indicated in this individual by one of those transient fugitive pains which seem seated particularly in the muscles of the thoracic parietes. At the end of thirteen days, this pain became suddenly aggravated, fixed, and permanent, and from thenceforward was accompanied with all the symptoms of acute pleuritis. If, on the 24th of July, a large bleeding had been employed, probably the inflammation would have been checked, and the effusion would not have taken place. Be that as it may, this effusion was considerable at the time of the patient's admission. There was then dulness of sound, and absence of the respiration in about the lower half of the left side of the chest. Two days after there was manifest increase of the effusion, and, what is remarkable, the ægophony then was heard for the first time; it was no longer found on the following day; then it reappeared at a later period, when the effusion was now perceptibly diminished; finally, it again ceased to be heard before the complete re-establishment of the sound and of the natural respiratory murmur.

We shall carefully note the different bronchial rales which, at a certain period of the disease, were heard on the left side, notwithstanding the effusion;

we shall also note the gradual manner in which the respiratory murmur was re-established, according as the effused liquid was absorbed.

At a time when the collection was still considerable, there was no longer either cough, dyspnœa, or fever; strength good, appearance of the countenance excellent, and what cannot be too much dwelt on, one would then have looked on the patient as convalescent, without the signs afforded by percussion and auscultation. It was these signs that made M. Lerminier keep the patient on a strict regimen, notwithstanding the apyrexia. However, the effusion did not diminish; so that, in this case, nature, left to herself, seemed insufficient to effect the cure. It was then a very large blister was applied over the chest; the patient appeared to be in the most favourable condition for the success of this treatment. Accordingly, a little time after its application, the effusion began to diminish; it was not till after the complete absorption of the fluid that the blister was allowed to heal. Up to this period the patient took but very little aliment. This severe regimen seconded very much, no doubt, the action of the blister. Notwithstanding this long privation of food, the effusion was scarcely absorbed, when the patient recovered strength and flesh with astonishing rapidity.

Nearly a month elapsed between the commencement of the effusion and that of its total absorption.

Case 6. — A man, twenty-seven years of age, of a sanguineo-lymphatic temperament, fatigued himself very much on the morning of the 24th of August, and exposed himself to a current of cold air whilst he was in a perspiration. In the night he felt some headache, and a little shivering. On the night of the 24th, he awoke with an acute pain below the left breast; this pain continued all the day. The patient kept his bed; in the night he began to cough. On the 26th, the pain had not diminished; he then consulted a medical man, who merely recommended him some demulcent mixture. On the 27th, two grains of tartar emetic were given to him; — copious bilious vomiting, and several stools; — he felt himself considerably relieved during the day; the pain of the side was lessened, the cough became lighter, and the breathing more free. Thinking himself nearly well, he strove to get up on the 28th, but, alarmed at his weakness, he lay down again, and entered the Charité on the 29th of August. From the invasion of the disease up to the present period profuse sweats took place every night.

State on the 30th: — Pain no longer felt except during the cough, by percussion or by simple pressure; cough light and dry; breathing short and hurried; deep inspirations were painful and brought on cough; the patient remained half sitting up in the bed; lying down considerably increased the dyspnœa. Over all the right side the sound was very clear, and the breathing loud and distinct; on the left, posteriorly and laterally, from the fifth rib down, the sound was very dull, the respiration none, and ægophony doubtful; higher up on this same side the sonorousness reappeared, but the respiration was heard to be much weaker than on the right; it was the mechanical result of the compression to which the lung was subjected, and which only allowed the ingress of a smaller quantity of air in a given time. Pulse not frequent but hard; skin moist and not hot; tongue covered with a white coat; anorexia; thirst; no stool for the last three days.

Diagnosis; *pleurisy on the left side which has terminated in effusion.* To prevent the latter from increasing, and to favour its absorption by diminishing the inflammation, such appeared to be the indication to be fulfilled. (Venesection to sixteen ounces; forty leeches over the left side; demulcent mixture.)

Under the influence of this treatment, the dyspnœa became less in the day; in the night there was an increase of fever. The blood taken from the vein was not buffed.

On the 31st, the ægophony, doubtful the preceding day, was now evident. (Two blisters to the legs.)

Sept. 1st. The pain of side entirely gone; perspiration at night; fever and constipation. (Purgative lavement.)

From the 2d to the 6th, the symptoms of the acute state disappeared gradually; the skin lost its great heat; the pulse became less frequent and softer; but every evening there was a well-marked febrile accession and perspiration at night; the breathing, which was free enough when the patient kept himself at rest, was very much hurried when he sat up or spoke; he lay on his back. Auscultation and percussion yielded the same information; ægophony continued to be evident; thus the effusion did not appear to have increased since the patient's entrance, neither had it diminished; the pleuritis appeared to have a tendency to pass into the chronic state. In this state of things, M. Lerminier covered the left side with a very large blister, and at the same time he tried to keep up a constant diaphoresis by means of Dover's powder (fifteen grains in three doses).

After the application of the blister the breathing became more and more free, the fever diminished, the night sweats did not cease. Towards the 15th, we began to hear the respiration very feebly posteriorly on the left, where some days before it was completely null. On the 18th, we found the pulse for the first time entirely free from frequency; the patient found himself very well; he arose from bed without experiencing any dyspnœa; he eagerly asked for food; a very small allowance was given him. The frequency of the pulse did not return on the following days. On the 22d, the respiration was heard a little louder on the left posteriorly; there was no ægophony. The patient now determined to leave the hospital.

On the 26th, we examined his chest again: the sound was still dull on the left posteriorly and laterally, from the last ribs to a little above the inferior angle of the scapula; over all this space the feebleness of the respiration contrasted with its strength in the other points of the chest; the effusion was far then from being entirely absorbed. In other respects the state of the patient was very satisfactory. He went out on the 27th.

We may remark in this case, what we have already endeavoured to show in several others, the difference of the symptoms which mark the existence of a pleuritic effusion according to the length of time the disease has existed, the quantity of liquid effused being the same. Thus at the commencement the most serious symptoms manifest themselves; acute pain of side, extreme difficulty of breathing, intense fever, general anxiety carried to the highest degree. In this state of things, nothing is easier than the diagnosis of such a disease; but at a somewhat later period these very acute symptoms are moderated, and partly disappear; the dyspnœa, less urgent, is only felt when some change in the habitual state of the patient, occasioned by an unusual movement, by the introduction of food into the stomach, by some mental excitement, etc., momentarily accelerates the motion of the blood; the skin loses its burning heat, and soon a slight acceleration of the pulse is the only sign that announces that the circulation has not yet returned to its normal state. When patients have arrived at this stage, they complain only of a want of return of strength, and they fancy that they are just on the eve of convalescence. The physician himself, if he were not enlightened by percussion and auscultation, would often participate in this hope. At a later period still, the pulse completely loses its frequency; the strength returns; walking, the effect of speaking, etc., no longer occasion any dyspnœa; it then seems that the lung which has remained sound has acquired an increase of action and of life, which renders in some degree useless the functions of the lung which is compressed by the effusion. But, at this time, if the chest be again percussed, if we examine the respiration with the stethoscope, we find that the effusion is not yet completely absorbed; it is

then that the strict observance of hygienic rules is of the utmost importance to the patient; if he submit to them, we may hope that the effusion will be gradually absorbed; if he neglect them, a relapse will soon supervene, the inflammation of the pleura will pass once more to the acute state, and will become more or less rapidly fatal.

We could observe these different phases in our patient; we saw that the treatment was modified in each of them. Whilst the symptoms were at their highest stage of the acute state, they were combated by copious bloodletting, general and local. A blister was applied over the chest, the action of the skin was called forth by Dover's powder, when the disease began to pass to the chronic state, and when general reaction was no longer to be dreaded. We shall not forget to note the temporary relief which followed the taking the two grains of tartar emetic by the patient before entering the hospital.

Case 7.—A pleuritic effusion consequent on the opening of a tuberculous excavation into the pleura.

A man, twenty-five years of age, entered the hospital with all the symptoms of pulmonary phthisis (frequent attacks of hemoptysis for the last two years; habitual cough since the same period; oppression; gradual diminution of strength and flesh). The chest sounded equally well in every part. On the right the respiratory murmur was strong and clear on the left, anteriorly and posteriorly, it was marked in different points by a rale or noise similar to that which is made by blowing with a pipe into soap and water. There was no evident pectoriloquy. Diagnosis: tubercular excavations in the left lung; pulmonary tissue healthy around them; during the fifteen days following the patient presented nothing new. At the end of this time we found him one morning lying on the left side, breathing with much more difficulty than on the preceding days, and not complaining of pain in any particular point. The chest, when percussed, yielded a dull sound on the left posteriorly; instead of the respiratory murmur, the sound already described was heard over this same extent; the voice had a particular resonance. The pulse was small and frequent; face pale and covered with sweat. (Blister over the left side.)

The three days following the dyspnœa increased; rapid emaciation; features very much altered; lies constantly on the left side, notwithstanding the blister; death.

Post-mortem. A pint of sero-purulent fluid in the left pleura. False membranes of recent formation covered the entire surface of the lung, the size of which was little diminished. When the false membranes were removed, we discovered on the external surface of the lung, a little above the interlobular fissure, an opening with rounded and flat edges, being from two to three lines in diameter. Through this opening was observed a cavity formed in the pulmonary parenchyma. A sound introduced into a bronchial division readily passed out through this opening. By cutting along the course of the instrument, we were satisfied that it penetrated into a large bronchial tube which opened into an immense cavity, over the external wall of which the opening had been formed. After this the cause of the pleuritis was no longer doubtful. In this same lung were other tubercles, several of which, being softened, already formed small cavities. In the intervals between them the pulmonary parenchyma was healthy. The right lung contained but a small number of tubercles still crude.

Pleuritic effusions, owing to the communication of a tuberculous cavity with the cavity of the pleura, are not very uncommon. Acute pleurisy, more or less immediately fatal, is the ordinary result of them. In the case now before

us, the absence of pain is a remarkable circumstance. The effusion was not considerable, for we heard a variety of ægophony; neither did the effused liquid prevent the cavernous rale from being heard.

It is not very uncommon to meet in phthisical patients tuberculous excavations, the external wall of which is formed solely, to a greater or less extent, by the pleura, thin and transparent as in the healthy state. In this case we can readily conceive the possibility of this membrane being ruptured, and thence the production of a pleuritis.

It is not only in the case where large cavities exist that we have seen effusions supervene owing to the openings of these cavities into the pleura. We found a similar effusion in an individual whose lungs contained at the very utmost but five or six small tubercles. But one of them, about the size of a hazel-nut, developed immediately beneath the pulmonary pleura, and already softened, occasioned its perforation.

In most of the cases where pleuritis results from the opening of a pulmonary cavity into the pleura, there is at the same time pneumothorax.

Case 8.—Pleuritic effusion formed by blood.

A man, forty years of age, brown skin, and apparently of a strong constitution, had enjoyed good health up to the commencement of January, 1822. He then began to cough; but for a month this did not prevent him from attending to his usual business; his health did not seem changed; at the end of a month he was seized with a severe pain of the side, on the level of the right breast, at the same time there was oppression and fever. Having entered La Pitié, he was bled six times in six weeks. At the end of this time he left the hospital, still retaining a very slight cough and a little dyspnœa. Wishing to resume his occupation, he again felt the pain of side, coughed more, and entered La Charité, the 24th of April. He then complained of a pain all over the inferior lateral part of the chest on the right side, which was increased by inspiration and by cough. The breathing was short, he panted a little when speaking; could lie in any position; expectoration was catarrhal. The chest, when percussed, yielded a very dull sound on the right side posteriorly and laterally; on the same side, posteriorly, on the level of the five or six first ribs, a very loud crepitous rale was heard; lower down nothing was heard. There was neither ægophony nor any resonance of the voice which could simulate it. The right side of the chest, when measured, appeared greater than the other by four or five lines. The pulse was frequent; skin free from heat; the patient had never either shivering or sweat. Bad taste in the mouth; anorexia; constipation. The existence of an effusion into the right pleura did not appear doubtful. The patient was very weak and exhausted. A large blister was applied over the right side.

His state continued the same during the four days following. On the 29th, the features were very much altered since the preceding day; the patient for the first time expectorated purulent sputa, which seemed to come from a tuberculous mass. On the 30th, he was scarcely able to pronounce a few words in a low voice; intellect intact. On the 1st of May he was dying. He had expectorated a small quantity of fetid ash-coloured sputa. He died in the night. Constipation continued till death.

Post-mortem. The right pleura presented an immense cavity, the upper wall of which, situate on a level with the fourth rib, was formed by the upper lobe of the lung, which was kept fixed to the ribs by thick false membranes. This cavity was filled with a liquid of a deep red colour, presenting all the physical characters of blood which has been drawn from a vein. Two or three

small clots were at the bottom of it. The ribs, lung and diaphragm were lined with thick and red false membranes, traversed by filaments which interlaced with each other, and left areolæ between them, which were all nearly of the same form and size.

The middle and lower lobes of the right lung were pressed on the lateral parts of the vertebral column. Their tissue was red and contained no air. The upper lobe contained several crude tubercles, between which the pulmonary tissue was very much engorged. Lelf lung was healthy. Heart presented nothing remarkable.

Inner surface of stomach white; considerable sub-mucous injection over all the small intestine. The large intestine presented through the entire extent of the colon five or six oblong ulcerations, the great diameter of which corresponded with the transverse diameter of the intestine; their bottom, which was blackish, and formed of thickened sub-mucous cellular tissue, presented in some of them grains of tuberculous matter; each of these ulcerations occupied at least two-thirds of the breadth of the intestine; in the intervals between them the mucous membrane was very pale, and of ordinary thickness and consistence. All the large intestine contained fæces. The mesenteric glands were tumefied, and most of them tuberculated. The liver, gorged with blood, presented several portions of a yellowish white which greased the scalpel; the spleen, of a large size, was reduced to a pap by pressure; close cellular adhesions connected the colon to the liver.

When first we examined this patient the pleuritic effusion had been already a long time formed: there is every reason to think that it began at the period when the pain of side manifested itself, a month after the catarrhal attack. The rest and treatment which this person received in La Pitié caused most of the symptoms to disappear, but they returned as soon as the patient, resuming his ordinary habits, drew a greater quantity of blood to the lung; thence the difficulty of breathing, reappearance of the pain, general anxiety, afflux of badly elaborated blood towards all the organs, and consequently defective nutrition, debility, speedy death, which would have been retarded by a more careful observance of the rules of hygiene.

The great quantity of the effused liquid was indicated by the great dulness of sound, the complete absence of the respiratory murmur, and of ægophony. Towards the apex of the lung only some crepitous rale was heard; the reason of this was seen in the circumstances connected with the upper lobe, which, being attached to the ribs by adhesions, could not be displaced by the liquid, and formed in some measure the vault of the cavity, which was filled with the fluid. The crepitous rale announced besides an inflammatory engorgement of the pulmonary tissue; its existence was actually ascertained.

The presence of sanguineous clots in the pleura does not admit a doubt but that the effusion in a great measure consisted of natural blood: this is not the most common case; usually the effusions of red liquids into serous membranes appear to consist merely of serum united to a greater or less quantity of the colouring matter of the blood, but without fibrin. Was this effusion sanguineous from the very commencement? Was the blood exhaled only towards the latter period of life? These questions cannot be solved. But what it is important to remark is, that during life this sanguineous effusion gave rise to no symptom which could enable us to distinguish it from a serous or purulent effusion. Above all, the very acute pain which is said to accompany the formation of such effusions was not observed.

We shall not dwell here on the development of the tubercles in the lung, in the intestines, and in the mesenteric glands, in a person whose constitution was any thing but lymphatic. We shall merely remark that in the abdomen their development seemed to be consecutive on the inflammation; that in the chest

they existed in the midst of an inflamed tissue, and only on the side where the pleuritis was.

We shall also direct attention, — first, to the nature of the expectoration, similar to that yielded by large tubercular cavities, and which was merely the product of the bronchial mucous membrane; secondly, to the absence of the diarrhœa in a case where extensive ulcerations existed in the large intestines.

Case 9.—Sanguineous effusion—False membranes tuberculated.

A servant, about fifty years of age, of a strong make, had always enjoyed good health. During the last three weeks of March, he felt below the left breast slight pains, which came several times and disappeared. However, he continued at his usual occupations. On the 4th of May, after dining, the pain of side, which had ceased for some days, suddenly returned with greater severity than ever; it continued all the night. The least motion, the slightest pressure, deep inspirations, exasperated it. On the 5th the patient began to cough, and kept his bed: leeches applied over the seat of the pain lessened, but did not remove it. From the 5th to the 12th of May he had dry cough, continuance of the pain, and great oppression. On the morning of the 13th, we saw him for the first time, when he presented the following state: —

Face pale, and cast down; decubitus in the horizontal position impossible, under pain of threatened suffocation. He remained half sitting up in the bed, the head and back being supported by pillows, as in diseases of the heart. Breathing short and hurried; pants a little when speaking; pain still remains. Cough frequent; expectoration catarrhal; sound very dull, and absence of all respiratory murmur at the left side; no ægophony. On the right, respiratory murmur clear and very loud; pulse moderately frequent; skin hot and dry. Diagnosis: pleurisy on the left side, which has terminated in effusion. (He was bled largely.)

The blood was buffed and cupped: the coagulum small, and surrounded by a large quantity of serum.

On the next day the breathing was less embarrassed; countenance more natural. Pain felt only when strong pressure is employed. (Another venesection.) Appearance of the blood the same.

15th. (A large blister to the side.) This night a profuse sweat for the first time. On the morning of the 16th, the breathing much more free than on the preceding days; lies equally well in any position; pulse scarcely frequent. The patient feels himself strong and cheerful. On the left the dulness of sound continued from the base of the chest as far as the middle of the scapula; higher up the sound was clear enough, and the respiratory murmur was heard there but feebly. It was evident that some of the effused liquid was absorbed.

17th. Evident ægophony was heard for the first time posteriorly. Thus, the appearance of this sign coincided here with the diminution of the effusion.

From the 18th to the 21st, the same state. On the night of the 21st, the breathing again became very much embarrassed all at once. The next morning a return of the orthopnœa, intense anxiety, dejection of spirits, pulse weak and very frequent. However, the signs afforded by auscultation and percussion did not show that the effusion had increased. (Two blisters to the legs.) In the course of the day the dyspnœa and frequency of pulse became less. During the rest of the month of April the state of the patient underwent no perceptible change. The breathing was but little embarrassed whilst he remained at rest; but the mere effort to get out of bed almost produced suffocation. Ægophony constantly evident, cough slight, pain entirely gone; pulse frequent, without the skin being hot; anorexia complete; tongue natural; evacuations of the ordinary character. The blisters on the legs and chest were allowed to heal, and

one was placed on the arm. Rice-milk and broths were allowed him for nourishment.

At the commencement of May sweats appeared every night; his debility made rapid progress, countenance became changed. These signs announced the approach of death. Still the respiratory murmur was re-established on the left side anteriorly; posteriorly we were beginning to hear it, but very feebly. The ægophony no longer existed. Then, though his general state was worse, the local disease appeared better. We strove to sustain his strength by giving every day a pint of decoction of polygala, with the addition of half an ounce of oxymel of squill, and an ounce of syrup of bitter orange peel, a little ether, kermes.

On the 20th of May he became uneasy about family affairs, wished to go home, and when he strove to walk about fifty paces, he found himself too exhausted to proceed; he then called for a vehicle, which he had scarcely entered, when he requested suddenly that the coach door should be opened, he lost all consciousness, and expired.

Post-mortem. The left pleura contained more than a pint of a liquid of a deep red colour, altogether like blood just taken from a vein. At the bottom of this mass there were observed reddish amorphous masses, formed of an areolated tissue, in the midst of which several small cavities were found full of liquid blood. The pleuræ costalis and pulmonalis were lined by false membranes of a bright red colour. Beneath them others were found, thick and white, in the midst of which several tubercles were developed. The left lung healthy, and, still very pervious to air, occupied the greater part of the cavity which ordinarily receives it. Nothing remarkable in the right lung, or right pleura. The heart was of the natural size, and well proportioned. Its right cavities contained a large fibrinous clot, divested of colouring matter. This clot distended very much the auriculo-ventricular orifice, and was continued into the venæ cavæ and pulmonary artery.

The inner surface of the great intestine very much injected. The lateral ventricles were distended by a considerable quantity of transparent serum.

In this patient, as in the preceding, the pleuritic effusion consisted in a great measure of blood. Neither in him did any particular symptom indicate this species of effusion; and it is impossible to say whether it was such from the commencement, or whether the sanguineous exhalation took place only since the 20th of May, the time at which we observed the temporary aggravation of the symptoms, which did not coincide with an increase of the effusion: the white colour of the deep-seated false membranes seems to show that the effusion was not originally sanguineous.

The collection also had been much more considerable than was found at the *post-mortem* examination. The signs afforded by auscultation and percussion indicated its different periods of increase and diminution. Thus the dulness of sound diminished progressively from the upper part of the thorax towards the lower. The respiratory murmur, at first totally absent over the entire extent of the left side, was heard first feebly below the left clavicle, then over all the remainder of this side. Thus the existence of half a litre of liquid in the pleura did not prevent the respiratory murmur from being heard, only it rendered it much weaker. With respect to the tremor of the voice, which was none at first, it did not begin to appear till the quantity of effused liquid had been considerably diminished; subsequently, when the effusion became still less, the ægophony ceased to be heard.

We have already pointed out that want of correspondence between the progressive diminution of the effusion, and the general state of the patient, which continually became worse. Can the nature of the effusion account for it? The patient was now arrived at the last stage of exhaustion, when he attempted

to make an unusual exertion. Did the acceleration of the pulmonary circulation, which was the result of it, occasion his sudden death.

Let us now look back to the onset of the disease: it was announced, or rather preceded, by an indefinite, temporary pain, not very severe, nor accompanied by any serious symptom, which seemed to depend only on inflammation of the pleura, very slight and circumscribed. The application of some leeches, rest, strict regimen, and emollient cataplasms would probably have removed it. Being neglected, it became more severe, spread, and was changed into a fatal disease.

We several times observed the state of orthopnœa, which is as rare in pleuritic effusions without complication, as it is common in diseases of the heart. The perspirations which appeared towards the eleventh day, dating from the period when he took to the bed, were accompanied with evident improvement. On the following days, the skin remained dry; subsequently, the sweats reappeared; but this time they were purely symptomatic, exhausted the patient, and hastened his dissolution. Does their appearance mark the time when tubercles began to be developed in the pleura? We think, we have ascertained that, in several chronic inflammations, profuse sweats supervene only when tubercles are formed in the inflamed tissues.

The fever was usually announced only by the frequency of the arterial pulsations; two or three times only the temperature of the skin was perceptibly raised. This simple frequency of the pulse, without heat of skin, is, in many chronic inflammations, the sole index of the disturbance of the circulation; no feeling of illness results to the patient from it, since in that state he does not suppose that he has any fever, whilst he complains of it the moment the skin becomes hot.

Case 10.—A pleuritic effusion opening externally between the ribs.

A woman, fifty-five years of age, entered the La Charité 10th of July. Two months before she had had a pulmonary attack, with pain, below the right breast, and dry cough: since that time she has cough and shortness of breath.

State on the 11th of July: — face flushed, great anxiety. She can lie only on the right side; the integuments on this side of the thorax are œdematous; the dyspnœa is very great, and as soon as the patient sits up, she is seized with violent kinks of coughing, which prevent us from availing ourselves of auscultation. On the other hand the infiltration of the integuments renders the signs afforded by percussion uncertain, nor indeed can it be employed in consequence of the pain it occasions. The sputa, which are free, are those of chronic bronchitis. Pulse frequent: no heat of skin. (Blisters to the legs.)

The day after, the 12th, the patient being more tranquil, we were enabled to employ auscultation. The respiratory murmur was heard on the left, loud and clear. On the right it was heard in every part very clear, but very feeble.

From 15th to 16th, state the same: constantly lies on the right side.

17th. Pulse more frequent; skin hot; dyspnœa increased; on the right the respiratory murmur no longer heard; more resonance of the voice than on the left. The effusion evidently increased. (Venesection to twelve ounces; — demulcents.)

18th. Blister to the right side. On the following days the difficulty of the respiration not diminished; the patient complained so much of the blister that we had it removed; another was applied to the arm. Constantly lying on the right side, the integuments of which were always œdematous, she could with difficulty utter a few words with a panting voice; over all this side, re-

spiratory murmur gone. Slight frequency of the pulse ; skin but little hot and dry.

29th of July, we found the patient lying on her back for the first time. Besides the infiltration of the preceding days, we observed beneath the right clavicle a swelling which extended to near the mamma ; pressure on this part excited acute pain. During the following days this tumour made evident progress ; fluctuation became evident in it. A bistoury was plunged into it on the 16th of August ; a considerable quantity of thick pus, mixed with albuminous flocculi, flowed from it ; this quantity of liquid was so great, that there was reason to think it came from the pleura. At each inspiratory movement, we perceived a greater quantity of pus come out. The three following days much pus was seen to flow through the lips of the incision. The patient stated that she breathed more freely since the abscess was opened ; however, her features became rapidly changed ; the extremities became cold, and death supervened four days after the opening of the abscess.

Post-mortem. The abscess being fully cut into, we found pus infiltrated through a great portion of the subcutaneous and intermuscular tissue of the right side of the chest. Between the fifth and fourth ribs there was an opening with irregular edges, through which the pus contained in the pleura made its escape externally from the chest. A great quantity of purulent liquid filled the right pleura. False membranes lined the ribs and the lung ; the latter, pressed against the lateral parts of the vertebral column, was reduced to a small size, and was empty of air ; its parenchyma was healthy, as well as that of the left lung.

From the inner surface of the neck of the uterus, a pedicle, five or six lines in length, was detached, appearing as if a continuation of the mucous membrane ; it was prolonged beyond the orifice of the neck, and terminated, at about a line from this orifice, in a globular body, about the size of a hazel nut, hanging between the two lips of the neck, before which it projected : it consisted of a multitude of small agglomerated serous cysts.

The infiltration of the integuments, the pain, and kinks of coughing, were so many circumstances which at first prevented us from the advantage of employing percussion and auscultation. The following days, auscultation having now become practicable, detected the existence of a pleuritic effusion on the right ; this effusion which, at first, was so inconsiderable as not entirely to prevent the respiratory murmur from being heard, was afterwards increased, occupied all the right cavity of the chest, and ultimately made its exit through an intercostal space. From the time the subcutaneous abscess had been artificially opened, and the pus contained in the pleura began to make its way out, the patient sunk with frightful rapidity ; so that, in this case, that which seemed a means of cure prepared by nature, became, on the contrary, a cause of more speedy death.

We have seen an account of two other cases of pleuritic effusions, in which the liquid collected in the pleura also made its escape externally under similar circumstances. Then in those two cases, as in that just cited, an abscess formed between the ribs and skin ; it was also opened ; but further, a real operation for empyema was performed, and the patient recovered.

One of these facts, cited in the *Nouveau Journal de Medecine*, was extracted from the Italian journals : the other from the London Medical Repository. The former we shall insert in this place : —

A boy, fifteen years old, had an attack of acute pleurisy which passed on to suppuration. There gradually appeared a small tumour between the third and fourth true ribs. After the application of emollients, a small incision was made over the most dependant part of the tumour, and a great quantity of pus escaped. After being seven months labouring under the disease, and being now reduced to the last stage of emaciation, the patient consulted Dr. Pacini, who thought that the abscess should be opened by an incision made two ribs below the fistu-

lous opening; he penetrated with the instrument between the intercostal muscles, and, making an incision in the pleura, he now entered the chest. He found the lung adhering, and perceived that he had not penetrated the focus of the suppuration. The wound remained open for two days, during which time the cough became more frequent, and the oppression greater. On the third day a great quantity of pus escaped through the new incision, and much less through the former wound. In the space of two months the latter was entirely closed; the new one continued to suppurate for five months: at the end of this time the cough disappeared, and the cure was complete.

Is it very certain that there really was in this case an effusion into the pleura?

CHAPTER III.

PARTIAL PLEURISIES.

Circumscribed inflammations of the pleura are very frequent. They seldom give rise to any febrile disturbance, nor do they in any way disturb the ordinary functions, and are announced only by more or less acute pain in some limited part of the thoracic parietes; sometimes this pain is temporary; sometimes it continues for several days. A slight albuminous exudation supervenes, which in time becomes changed into laminated tissue. Thence the formation of cellular adhesions, which unite more or less closely the pleuræ costalis and pulmonalis. These adhesions are often observed in persons who have not had any serious affection of the chest during life. We also found, but more rarely, similar cellular bands uniting different small portions of the peritoneum, such as the liver and colon, or two convolutions of small intestine, though the individual presented during life no symptom resembling those of peritonitis. Finally, we also observe these same adhesions, and even more frequently than in the peritoneum, between different portions of the arachnoid, in persons who presented no symptoms whatever of arachnitis. The small bodies usually designated *glands of Pacchioni* are actually nothing but albuminous concretions, the result of inflammation. Their great frequency is no reason for considering them as appertaining to the healthy state, for they are not met more frequently than the cellular bands of the pleura, and no one will, at the present day, consider the latter as natural ligaments, as was formerly done. What are we to infer from these facts? This, that inflammation of serous membranes, when it is not very extensive, may arise, be developed, and even produce false membranes, without this pathological process being announced by any other symptom than a pain more or less acute: the pain itself may be wanting.

These partial inflammations of the pleura may exist alone, as we have seen; but they much more frequently supervene in cases where the pulmonary parenchyma is affected; they are even an almost constant complication of this affection. Thus pleuro-pneumonia is a much more common disease than simple pneumonia. Thus almost all phthisical patients are subject to suffer from time to time pains in different parts of the thoracic parietes; these pains have their exclusive seat in the pleura, and indicate inflammation of one of the points of this membrane. Thus after death the lungs of phthisical patients are almost always found united to the ribs by cellular bands, more or less numerous; their number is generally in the direct ratio of the quantity of the tubercles, and they exist particularly in the points corresponding to the parts where the tubercles are most abundant. In a person whose lungs contained but one tubercle, situated almost immediately under the pleura, at the base of the upper lobe of the right lung, we found the pleura entirely free from adhesions, except in the part corresponding to this tubercle. In this point there existed a thin cellular

band, which united the two lobes. These partial pleurisies appear to have a tendency to form, when the tubercles are still crude, and the pulmonary tissue surrounding them is still very healthy.

Some species of partial pleurisies merit particular attention, in consequence of the particular symptoms to which they give rise. Such are principally diaphragmatic and interlobular pleurisies; such also are the partial effusions which form either between the ribs and lung, or between the lung and mediastinum, or merely toward the summit of the lung. We shall cite some examples of those different species in so many separate paragraphs.

ARTICLE I.

DIAPHRAGMATIC PLEURISIES.

SECTION I.

ISOLATED DIAPHRAGMATIC PLEURISIES.

Case 11. — A cabinet-maker, twenty-six years of age, entered La Charité in the month of April, 1822. Two days before he had been seized, whilst at work, with a slight shivering, which was soon followed by a burning heat. In the midst of this, an acute pain was felt in the left hypochondrium, along the cartilaginous edge of the ribs; at the same time there was considerable oppression. The patient endeavoured in vain to remove this pain by the application of hot cloths, and by swallowing some *eau de vie*, in which he mixed up a considerable quantity of pepper. He had no sleep during the night, and was very restless. He had hiccup three times. On the next day, the pain in the hypochondrium still continued, dyspnœa increased, cough became frequent. We saw the patient for the first time the beginning of the third day. He was sitting up with the trunk bent forwards, his hand continually applied to the hypochondrium, the slightest pressure on which occasioned him to scream aloud; he with difficulty pronounced a few words in a broken, interrupted voice; his features expressed the most intense anxiety; his inspirations short and frequent, were performed only by the elevation of the ribs; the cough was frequent; no expectoration; percussion and auscultation afforded no information; the pulse was very frequent and hard, skin burning and dry; intellect perfectly clear.

M. Lerminier suspected the existence of a diaphragmatic pleuritis; he ordered a bleeding of twelve ounces, and the application of twenty leeches along the cartilaginous edge of the false ribs of the left side. In the course of the day, the pain diminished a little, but in the evening it returned with increased violence, and in the night the patient became delirious. On the morning of the fourth day, intellect again returned, but the pain and orthopnœa continued; the respiration and cough presented the same characters. The pulse had lost nothing of its frequency or hardness; the muscles of the face presented some convulsive movements from time to time. (Another bleeding to twelve ounces; twenty leeches to the affected side; emollient drinks.) There was some remission during the day; he became worse towards evening, and delirious during the night. (Sinapisms to the legs.) On the fifth day, there was a continuance of the same symptoms, and also continual nausea. (Blister to the thigh.) On the sixth day, the features were very much altered; lies on his back; voice gone; hiccup and nausea from time to time. He died in the evening.

Post-mortem. The two portions of pleura which line the base of the left lung, and the upper surface of the diaphragm of this same side, were very much

injected and covered with albuminous exudations, which extended from the one to the other. The other parts of the pleura were very healthy, as well as the lungs; nothing remarkable in any of the other organs.

The symptoms of inflammation of the diaphragmatic pleura were the more marked in this case, as no other disease complicated it. Here death supervened, as in cases of peritonitis, without any material lesion of any of the organs essential to life. The partial inflammation of a serous membrane is sufficient to occasion the most alarming symptoms by the sympathetic disturbance excited in the nervous system.

Case 12. — A tailor, thirty-one years old, had had for the last two years several attacks of hemoptysis; he habitually had a small dry cough with slight dyspnœa, when, on the 5th of October, after having been wetted very much in the rain, he felt towards the xiphoid cartilage an acute pain which obliged him to bend his body, and impeded his respiration. He applied twelve leeches over this part; the pain disappeared; the next day it was again felt at intervals. The day after he awoke from sleep, about three o'clock in the morning, in consequence of a violent pain, which at this time was seated along the cartilaginous edge of the ribs of the right side, and extended even through the entire hypochondrium, and as far as the flank of the same side. At the same time he was extremely uneasy; a continued desire to cough, without venturing to satisfy it for fear of exasperating the pain; he vomited twice or thrice in the course of the day. He entered the hospital, and on the morning of the 8th he presented the following state: — Face pale, expressing the most intense anxiety; breathing short, performed merely by the motion of the ribs; small continual cough; pain in the place already mentioned, which was increased by pressure. On making slight pressure on the epigastrium, nausea was excited, as also hiccup, which soon ceased, but which was reproduced by pressure. Lies on his back; the patient refuses every species of motion, so that it is impossible to employ percussion or auscultation but very imperfectly; high fever; tongue natural. (Application of thirty leeches over the right hypochondrium.) The 9th of October, the pain extended again to the epigastrium; the patient, in order to relieve himself, is almost constantly sitting up in the bed, the thorax being inclined on the abdomen. The chest, when percussed, sounds well in every part; the respiration, when examined, is heard to be feeble but clear. (Venesection to eight ounces; twelve leeches to the epigastrium.) In the course of the day the pain of epigastrium disappeared; that of the hypochondrium still continued; the breathing a little freer after the bleeding. On the sixth day, a slight icteric tint over the entire surface of the skin; conjunctiva very yellow; same state in other respects. On the 7th day, pain almost gone; breathing easier; coughs but seldom; no expectoration; lies on his back. In the evening, sudden return of the pain of right hypochondrium, and with it of all the other symptoms. Vomiting of green bilious matter in the night, after which the pain became so acute, that the patient for a moment lost all consciousness. The next morning, eighth day, features sharpened; lips retracted and convulsively agitated; orthopnœa. The patient, sitting up, is not willing either to speak, or to make the least motion for fear of exasperating the pain; pulse frequent and hard; skin hot; yellow colour of the skin and conjunctiva is very marked. (Venesection to eight ounces; emollient and narcotic cataplasms over the epigastrium and right hypochondrium.) In the course of the day the intellect became disturbed; screams aloud. On the 9th day, pain only felt when he coughs or makes any exertion; but the breathing is very much impeded; frequency of pulse still continues. Auscultation and percussion gave no new information; jaundice still continues. On the 10th day, the respiration is distinctly heard less on the right than on the left, where it has become *puerile*. Dyspnœa considerable; pain of hypochondrium very obtuse; patient complains

of having frequently a desire to vomit; tongue natural. (Two blisters to the thighs.) On the 11th and 12th days, the same state; the right side of the chest perceptibly less dilated than the left. On the 13th day, hiccup for several hours, during which the pain of hypochondrium and epigastrium is renewed; jaundice not diminished. On the 14th and 15th days, dyspnœa increased; pulse again very frequent; features altered; respiration heard but very feebly on the right; sonorousness of chest not sensibly diminished on this side; the last sternal ribs of right side appear to be a little depressed; the liver is felt for the first time in the hypochondrium. (Blister over the right side of the chest.) On the 16th, 17th, and 18th days, the sharp edge of the liver is felt almost on a level with the umbilicus. Extreme oppression; nausea; frequent hiccup; the patient is tormented with vomiting. He fell in a few days more into a state of coma, and died.

Post-mortem. The base of the right lung was separated from the diaphragm by a sero-purulent effusion, which was circumscribed on all sides by membraniform concretions which extended from the diaphragm to the lung: this effusion compressed both the right lung and liver at one and the same time. Other parts of the pleura healthy; lungs filled with miliary granulations, surrounded with a tissue which crepitated, but which was engorged posteriorly; heart and pericardium natural; subarachnoid cellular tissue covering the convexity of the brain very much injected; milky serum in the lateral ventricles.

In this person we at first found nearly the same symptoms as in the subject of the preceding case; there was, besides, a well-marked jaundice, the result probably of the irritation transmitted by contiguity of tissue from the diaphragmatic pleura to the liver. However, the symptoms of the acute affection became mild, and then appeared new phenomena which announced the transition of the disease to the chronic state. The diminution of the respiratory murmur on the right side, with continuance of the sound on the same side, might have induced one to believe in the existence of emphysema of the lung; but that, as well as the descent of the liver into the hypochondrium, was but the mechanical result of the circumscribed effusion, of which the diaphragmatic pleura was the seat. Though, in this case, the great embarrassment of the respiration, and the great frequency of the pulse rendered the prognosis very unfavourable, the patient might still have dragged out existence for some time; his recovery even should not be considered as impossible when a super-acute arachnitis suddenly carried him off. It is scarcely necessary to say that the miliary granulations found in the two lungs account sufficiently for the hemoptysis, the habitual cough, and the slight dyspnœa felt by the patient for a long time.

With respect to the depression of the liver, owing to the pleuritic effusion, this case somewhat resembles one mentioned by Stoll. An individual, he says, affected with a pleuro-pneumonia, felt on the nineteenth day a very acute pain in the left hypochondrium; the signs of empyema manifested themselves, and the spleen soon formed a projection in the left flank. At the autopsy more than twelve pints of pus were found in the left side of the chest. The diaphragm, depressed by this liquid, projected into the abdomen and pushed the spleen before it, so that, says Stoll, the pain which we thought belonged to an organ of the abdomen, had its seat in the chest.

Case 13.—Diaphragmatic pleuritis, with perforation of the diaphragm.

A mason, thirty-seven years of age, entered the Charité, 8th of May, with all the symptoms of pulmonary phthisis in the second stage. Towards the beginning of June, he several times felt stitches in the side, which were removed by some applications of leeches. On the 11th of June, in the midst of the evening febrile exacerbation, he was seized with an acute pain on a level with the last false ribs of the left side; this pain continued on the following morning; the breathing was short, hurried, and entirely costal; a profuse hemoptysis came

on at the same time. (Bleeding general and local; revulsives to the lower extremities.) The spitting of blood was arrested, the pain was lessened, but did not cease. Towards the 20th of June, it extended to the left hypochondrium, and as far as the flank of this side; dating from the latter period, he wasted rapidly; immense caverns formed in the pulmonary parenchyma, where pectoriloquy and the mucous rale announced them. The patient died the 18th of July. From the commencement of July, the pain of the hypochondrium and left flank was felt only on pressure, sudden movements, deep inspirations, or kinks of coughing. The breathing, which was much more embarrassed than in most phthisical persons, was constantly performed merely by moving the ribs.

Post-mortem. Vast tuberculous cavities in the two lungs; cellular adhesions of the pleura costalis and pulmonalis in a great many points; sound state of the right diaphragmatic pleura, and of the corresponding pulmonary pleura. On the left, on the contrary, the base of the lung adhered somewhat firmly to the diaphragm. We had scarcely destroyed the membraniform adhesions which kept these parts connected together, when we observed an immense abscess which existed both in the chest and abdomen. There the diaphragm presented a perforation about one inch and a half in diameter, through which the pus which was first formed in the pleura had passed in order to enter the abdomen. The edges of the perforation were smooth and blunt, as if it had been of some standing. The pus which had penetrated into the abdominal cavity seemed to have pushed the peritoneum before it. Lodged between the spleen and the parietes of the abdomen, it was bounded on all sides by cellular bands closely connected, which formed for it a sort of pouch. The inner surface of the latter, as well as the edges of the opening of the diaphragm, was lined by a pseudo-membrane of considerable thickness, which was, as it were, villous, and which, when placed in water, appeared to be covered with numerous filaments, such, in a word, as is often found on the inner surface of abscesses. Around the perforation the tissue of the diaphragm appeared not at all altered. Nothing remarkable was found in the other organs.

The symptoms which here accompanied the diaphragmatic pleuritis were less numerous and less alarming than in the two former cases: the pain alone announced its invasion. Its extension to the hypochondrium and flank marked probably the moment when the diaphragm, being perforated, allowed the pus to escape into the abdomen. We shall not attempt to explain the cause of the perforation of the diaphragm; we shall not determine whether this muscle was first inflamed and softened, and whether the solution of continuity took place, either by the simple progress of its softening, as happens in the tissue of the transparent cornea, or by the mere mechanical pressure of the pus on the muscular fibres previously softened; a *pleuro-diaphragmitis* might be admitted in this case. But what must not be lost sight of is, that around the perforation the muscular tissue was perfectly healthy: so that, in this point of view, this case may be assimilated to those perforations of the intestinal canal said to be spontaneous, in which the tissue surrounding the perforation is also oftentimes found exempt from all lesion. Let us observe, in fine, that, in this case, where there really was an affection of the diaphragm, we did not remark the risus sardonicus, which has been laid down as one of the most characteristic signs of inflammation of this muscle.

We have seen several consumptive patients who complained, at different periods of their disease, of a pain which had its site either along the cartilaginous edge of the ribs, or in one or other of the hypochondria. These pains, generally not severe, temporary, and unaccompanied by any alarming symptom, we thought might be referred to partial or slight inflammation of the diaphragmatic pleura, and in several of those who died, we actually detected its existence; in others, to be sure, we found no trace of it. Others presented adhesions, more

or less extensive, of the lung and diaphragm, though during life they had not complained of any pain, nor did they present any sign which could have made us suspect them.

SECTION II.

DIAPHRAGMATIC PLEURISIES CO-EXISTING WITH A COSTO-PULMONARY PLEURISY.

These are more frequent than the preceding; their diagnosis is often more difficult, and their prognosis necessarily more unfavourable.

Case 14.—Latent pleuritic effusion—On a sudden, signs of diaphragmatic pleurisy, and death.

A tailor, nineteen years of age, entered the Charité on the 18th of January. For the last three weeks he said he felt wandering pains in the left side of the chest, with cough dry or accompanied by some mucous sputa. However, it was only since the last three days he left off his ordinary work; since then the breathing is difficult, and he is feverish. (Ten leeches to the chest.) On the morning of the 19th, he presented the following state: — Pain now felt, and very slightly, only when he lies on the left side, when this side is pressed or percussed. Sound dull posteriorly in the lower three-fourths of the left side; in this same part the voice is marked by a sort of tremor; this particular sound becomes peculiarly marked in the pronouncing of certain words, such as the word *oui* (ægophony). Then too the ordinary respiratory murmur is not heard; but at each inspiratory movement a particular murmur is heard, a sort of souffle, which indicates that the air does not penetrate beyond the large bronchial tubes. The existence of a considerable effusion into the left pleura appears evident. However, the breathing is scarcely embarrassed, the frequency of the pulse is very slight; skin retains its ordinary temperature; decubitus almost indifferent. The patient coughs but little, and expectorates only some mucous sputa. (Venesection; four palettes; two blisters to the legs.) On the 20th, the same state. (Blister to the left side.) 21st, sound still more dull on the left; continuance of the ægophony; the inspiratory movements, shorter and more frequent, are performed principally by depression of the diaphragm. From this to the 3d of February, no perceptible change. He was free from fever; though habitually lying on his back, he could, without any uneasiness, lie on either side; had scarcely any cough, and assured us that he felt no dyspnœa whatever; his speech firm; movements free; face quite natural; appetite excellent; in a word, one would have supposed that the patient had perfectly recovered, did not percussion and auscultation announce the contrary. Such was the very satisfactory state of the patient, when, on the 3d of January, at eleven o'clock in the morning, he was seized with an acute pain, which, having its principal seat in the left hypochondrium, extended from thence, on the one hand, to the epigastrium, and on the other, to the left flank, not far from the crest of the ilium. In the course of the day, there was considerable oppression and intense fever. (Sinapisms to the legs.) On the morning of the 4th, features drawn, and expressive of the most intense anxiety; pulse frequent and extremely small; skin not hot; inspiratory movements short and very frequent; pants when he speaks; pressure on the left hypochondrium painful; respiration now performed only by the motion of the ribs of the right side. M. Lerminier announced the existence of diaphragmatic pleuritis. (Thirty leeches to the left side.) On the 4th, the patient was sitting up, the trunk inclined forwards; he said that he was smothering. In other respects, the same symptoms. The

three following days, a progressive diminution of the pain of the hypochondrium; constantly lies on the left side; cannot lie on the back or right side without being threatened with suffocation; sound very dull all over this same side, anteriorly and posteriorly; continuance of the ægophony; profuse diarrhœa. (Large blister to the epigastrium; rice water with gum.) On the 8th, features very much altered; respiration still performed only by the motion of the right ribs; pulse constantly frequent and very small. On the 9th, profuse sweat; diarrhœa diminished. During the three following days, there was nothing remarkable but alternations of sweat and diarrhœa. The left side of the chest, measured on the 12th, was found to be broader than the other by from eight to nine lines. On the 14th, at eight o'clock in the morning, the total alteration of the features, the extreme dyspnœa, and great debility of the patient, seemed to announce the near approach of dissolution. Ægophony was still heard very distinctly. He died at eleven o'clock.

Post-mortem. An enormous quantity of a purulent greenish liquid filled the left pleura. The costal, pulmonary and diaphragmatic pleura of this side, were covered with white false membranes, wrinkled on their surface, thick over the lung, thin everywhere else. The lung, pressed on the lateral parts of the vertebral column, was almost empty of air. The large bronchial tubes were red, the small white. The diaphragm, which was pushed down, passed down below the edge of the false ribs, and drove the spleen into the left flank. The heart, which was pushed to the right by the effusion, took a vertical direction behind the sternum; thus, during the last periods of life, the pulsations of the heart were no longer perceived in the precordial region, but they were heard with great force at the lower part of the sternum, and in the right side anteriorly; the heart was in other respects healthy. The pericardium contained a little lemon-coloured serum. Venous injection of the stomach and small intestine; red patches of the mucous membrane in the large intestine.

In this patient the pleuritis was not announced by serious symptoms until the inflammation extended to the diaphragmatic pleura; we again find here the same symptoms as in the preceding cases. We should particularly remark the sudden change of the manner of the respiration, which ceased to be abdominal as soon as the diaphragmatic pleura became inflamed. We must also be struck at the seat of the pain, which was felt lower down than in any of the other cases. Were we not afraid of passing the limits of our subject, we might still point out other important circumstances in this case, such as the insidious onset of the disease, the absence of every alarming symptom at the time the effusion was more considerable, the existence of the ægophony in a case where the effused liquid was so copious as to enlarge the thoracic parietes, throw the heart to the right side, depress the diaphragm, etc.

Case 15.—Diaphragmatic pleuritis supervening during the progress of pulmonary phthisis.

A man, twenty-six years of age, had had several attacks of hemoptysis, when he entered the Charité, in the month of December. He was then emaciated and weak. The respiration, which was short, was performed by the double movement of the ribs and diaphragm. Some crepitous rale was heard in the posterior and left side of the chest. The sputa were profuse, consisting of a turbid serum, in the middle of which numerous flocculi were suspended; profuse sweats every night. Diagnosis: pulmonary tubercles beginning to soften: inflammatory engorgement of the lung around several of them. (Leeches to the left side.) Towards the beginning of January, digestive functions became deranged; nausea; vomiting of his drinks. These symptoms yielded to the application of leeches over the epigastrium. The tuberculous degenerescence of the lungs proceeded; evident cavity in the left lung at the end of January. On the 11th of February, an acute pain was felt by him along the cartilaginous

edge of the false ribs of the left side, and in the hypochondrium of the same side. On the 12th, this pain continued; extreme anxiety; features sharpened, and frequent convulsive movements in the muscles of the face. The patient was sitting up in the bed, the body inclining forward; he had passed the night in this painful position. The pulse, full enough till then, was now become very small. The existence of a diaphragmatic pleuritis apppeared certain to M. Lerminier. (Blister over the left side of the chest.) On the 13th, same state; the sound was not duller, auscultation gave no new information. On the 14th, the patient remained constantly sitting up in his bed; the pain became violent when he attempted to lie down. On the 15th and 16th, he could lie in the horizontal position; the breathing was a little less embarrassed; but the *dulness* of the sound, the absence of the respiration, the tremor of the voice, announced the formation of an effusion into the left side. Dating from the 17th, the patient remained constantly lying on the left side; he could not change in the slightest degree from this position without being threatened with suffocation. Up to the 23d, the strength diminished, the features became changed, and the breathing became more and more embarrassed. He died on the 23d of February.

Post-mortem. A considerable quantity of turbid serum was effused into the left pleura; soft white false membranes, not yet having any trace of organisation, lined the diaphragmatic pleura of this side, which was very red beneath them. Similar albuminous concretions extended, in the form of bands, from the pulmonary to the costal pleura, but only in the vicinity of the diaphragm. Crude and softened tubercles; greyish softening of the gastric mucous membrane in the great cul-de-sac.

Here the inflammation commenced in the diaphragmatic pleura: the signs which announced it were very well marked, then they disappeared, and nothing was observed but the ordinary signs of pleuritis, according as the effusion formed and extended between the lung and the ribs.

After having traced minutely, in the preceding cases, the symptoms which announced inflammation of the diaphragmatic pleura with more or less certainty, we shall now endeavour to give a succinct recapitulation of them. Of these symptoms, some presented themselves in all the cases which we saw; others were much less constant; some, in fine, which were considered by Boerhaave as characteristic of paraphrenesis, were not met by us in any case. In the first group of symptoms, we place — 1st. A more or less acute pain along the cartilaginous edge of the false ribs, generally extending into the hypochondria, and sometimes even to the flank. This pain was increased by pressure, inspiration, motion, and exertion of every kind; in one case only it began by being felt at the xiphoid cartilage. 2dly. Complete immobility of the diaphragm in inspiration. This phenomenon was particularly well marked in several of the patients who form the subject of the preceding cases: in them, as long as the costo-pulmonary pleura alone was affected, the respiration was abdominal; but scarcely had the pain of the hypochondrium announced the extension of the inflammation to the diaphragmatic pleura, when the abdominal parietes were no longer raised, and inspiration was produced solely by the elevation of the ribs. 3dly. A very remarkable anxiety, expressed particularly by the sudden alteration of the features. 4thly. An almost constant orthopnœa, with inclination of the trunk forwards. This symptom, which, however, is sometimes wanting, appears to us one of the most characteristic; patients in this situation dread the slightest motion, as being calculated to awaken most violent pain. When we find combined in the same patient either the different symptoms now mentioned, or only the two former, we should be inclined to suspect the existence of diaphragmatic pleuritis, and in several of our cases we have seen that it was announced with certainty.

Other symptoms, we have said, are much less constant. Such are the hiccup, the result of sympathetic irritation of the diaphragm, nausea and vomiting.

We have observed these latter symptoms in persons whose stomach was found perfectly healthy. Such also are the convulsive movements of the muscles of the face, and particularly of those of the lips; delirium which supervenes either in a continued or intermittent form. Finally, when the diaphragmatic pleura of the right side is the seat of inflammation, the liver may be sympathetically irritated, and jaundice developes itself. The co-existence of this jaundice with a more or less acute pain of the right hypochondrium may induce one to believe in the presence of hepatitis. A similar error appears to have been committed by Morgagni in a case of pleuro-pneumonia, where the pain existed only towards the xiphoid cartilage. When avowing his error in the matter, he says: *Adeo in medicinâ, facile est per ea ipsa interdum decipi, quæ facere videntur ad vitandas decceptiones!* (Epist. xx., part 31.)

With respect to the risus sardonicus, noticed by Boerhaave, Van Swieten, De Haen, etc., we never observed it.

Whatever be the respective importance of the different signs now passed in review, it should not be forgotten that the greater number of these phenomena may also be produced sometimes by one or more of the numerous organs lying in the upper part of the abdomen; our only aim was to show that they may often depend on diaphragmatic pleuritis. On the other hand, we should not lose sight of the fact, that this species of pleurisy may exist without being announced by any characteristic symptom, just as cases of arachnitis exist without delirium, of pneumonia without dyspnœa, and of peritonitis without pain.

ARTICLE II.

INTERLOBULAR PLEURISIES.

Case 16.—Rational signs of pulmonary phthisis—No information from percussion and Auscultation—Effusion of pus between the two lobes of the left lung—Some miliary tubercles in this same lung.

A sawyer, twenty-six years of age, entered the hospital on the 16th of February. He stated that, for the last four or five months, he had a cough and shortness of breath. He had never spat blood. When we examined him, he was in a state of marasmus. Cough not frequent; expectoration catarrhal; inspiratory movements short and frequent; he had never felt any pain in the thorax. The chest when percussed, sounded well in every part; the respiratory murmur was heard loud and distinct in all points: there was habitually a little fever, marked by frequency of pulse, and a little heat of skin, without there ever being any sweat. The digestive functions were nearly intact. We considered this person as labouring under chronic bronchitis, and probably pulmonary tubercles still in a crude state, with the pulmonary tissue healthy around them.

On the following days we heard in different parts different varieties of the bronchial rale (sibilous or mucous, often confounded with the crepitous.)

However, the patient's strength diminished, appetite was lost, diarrhœa set in, and he died about a month after admission.

Post-mortem. The left lung at first presented nothing remarkable. Adhesions united the two lobes, and seemed to have caused the fissure between the lobes to disappear, but the latter had ceased to exist only to the extent of some lines, and scarcely were the adhesions existing in this short space broken, when we discovered the remainder of the fissure considerably enlarged, and occupied by a purulent liquid, in a quantity sufficient to fill an ordinary glass; this liquid was inclosed in a pouch, the parietes of which, formed above and below of pulmonary tissue, were completed by thick false membranes which

extended from one lobe to the other; the remainder of the pleura of this side was exempt from all trace of inflammation. The pulmonary parenchyma contained a dozen tubercles almost of miliary size; in other respects it was healthy. The lung and pleura of the opposite side presented nothing remarkable. The bronchi of both lungs were very red. The gastric mucous membrane in its splenic half was reddish, very thin, and so soft, that the least scraping reduced it to a pulp. The mucous membrane of the termination of the small intestine, of the cæcum, and of part of the colon, was very much injected, and ulcerated in some points.

This example is sufficient to show how obscure the diagnosis of interlobular pleurisies is. It is evident that in this case it was impossible. The severity of the symptoms does not seem proportioned in this case to the small extent of the pleuritic effusion. The chronic bronchitis contributed probably, as well as this effusion, to produce the marasmus, to keep up the fever, and impede the respiration. Death was hastened by the gastro-intestinal inflammation.

Ancient authors appear to have more than once described, under the name of abscess of the lung, interlobular effusions similar to that now described.

ARTICLE III.

INFLAMMATION OF THE MEDIAN PLEURA, OR MEDIASTINUM.

Case 17.—Signs of effusion into the pericardium—Healthy state of this sac—Collection of pus behind the sternum and the costal cartilages—Tubercular diathesis.

A tailor, twenty-nine years old, entered the Charité in the latter end of December, labouring under slight and recent inflammation of the mucous membrane of the bronchi and intestines. (Leeches to the anus: demulcent ptisans.) In three days the gastro-intestinal mucous membrane was nearly gone, but the cough and fever were increased, and he complained of an acute pain between the left breast and the sternum, which was increased by the cough and inspiration. (Twenty leeches to the part affected.) The next day seat of pain changed, it being now felt below the right clavicle: this was considered rheumatic; he was bled to eight ounces. On the 31st of December the pain returned to its original seat: countenance expressive of the most intense anxiety; pulse hard and very frequent; we apprehended pericarditis. (He was bled to twelve ounces; thirty leeches to the precordial region.) Blood buffed and cupped; clot very small. On the 1st January no amendment; breathing short and hurried; pain acute; pulse frequent and hard, countenance pale and anxious; he lies on his back. The pain rendered percussion impossible: respiratory murmur and pulsations of the heart natural. M. Lerminier prescribed a third bleeding (eight ounces). The blood presented the buffy coat as before.

On the 2d of January pain less acute; respiration more free; pulse less frequent On the 5th (the eighth day since the appearance of pain), percussion now became practicable, detected a dull sound between the left breast and sternum, to the extent of three or four fingers' breadth in height. Over this same part the pulsations of the heart were heard to be weak, and as it were confused; the respiratory murmur not heard in this part. Pulse still frequent; lies on his back. We considered it likely that an effusion of pus was going on into the pericardium. (Blister to the precordial region.)

From the 5th to the 10th of January (thirteenth day) state not much changed; two blisters to the thighs. On the 11th sound very dull over almost all the precordial region; pulsations of the heart scarcely heard, neither ægophony, nor any particular resonance of the voice.

From the 15th to 20th, the sound became dull to a greater extent; *this dulness was more particularly remarkable at the lower part of the sternum*, where the

sonorousness is ordinarily so great. He continued to sink, and died the twenty-fourth day.

Post-mortem. Immediately behind the sternum, the cartilages of the eight or nine last ribs, and behind the anterior termination of those ribs, was found a vast cavity filled with thick pus. It was at first thought that this cavity belonged to the pericardium; but we soon satisfied ourselves that the pericardium was intact behind this accidental pouch, and that this cavity was formed entirely at the expense of the pleura, which, from the inner surface of the lung, passes behind the sternum to join that of the opposite side, and thus form the mediastinum. Thick false membranes, studded with numerous tubercles, circumscribed this collection of pus on all sides; albuminous bands, some of which were rather solid, traversed it in different directions. Externally this cavity was enlarged at the expense of the lung, which was compressed towards the ribs. On the right the upper lobe of the lung contained some tubercles, some of which were beginning to soften. Tubercles were found in the liver, some of them already softened. Some in the spleen, in one of the kidneys, and under the intestinal mucous membrane.

Did not the aggregate of the symptoms in this case seem to indicate the existence of an effusion into the pericardium, a consequence of acute inflammation of this sac? Such, however, was not the case; the patient had only partial pleurisy, and the pus existed only in the pleura. Auscultation afforded no sign which could enable one to avoid the error: ægophony not heard at any period. In this patient there was not much dyspnœa, except at the commencement, when the intensity of the pain prevented the thoracic parietes from moving: it is not then of the embarrassment of the respiration that the patient died; death was occasioned by the purulent secretion in a part of the pleura, and the simultaneous development of tubercles in the lungs, liver, spleen, kidneys, and intestinal canal. We saw how obscure this general process of tuberculisation was, which also took place in the false membranes of the pleura: no particular symptom announced it in the numerous organs, which were the seat of it, and yet nutrition was already sufficiently altered for death to be the inevitable result of it. Every medical man must have met cases in which the wasting of the patients admits no doubt of the existence of an organic lesion, though it may be impossible to determine the seat of it: this is the case in idiopathic hectic fevers, of which we now no longer meet any instances, since we have been more careful in our *post-mortem* examinations.

This case may also serve to show how useless the most active antiphlogistic treatment sometimes is, though it may have been employed from the very onset of the disease, and under the most favourable circumstances. Here bloodletting was employed very decidedly to a very great extent, and yet we sometimes see a very small bleeding sometimes remove, as if by enchantment, a commencing pleuritis. Why, when all the circumstances remain the same, is a remedy so effectual in one person of no avail in another? We may say with Baglivi: *De morbis pulmonum, etiamsi peritus in arte sis, vel censearis, noli cum jactantia de illis disserere, vel facilem promittere curationem.*

ARTICLE IV.

PARTIAL INFLAMMATION OF THE COSTO-PULMONARY PLEURA.

Case 18.—Partial pleuritic effusion with cartilaginous and bony false membranes—Pulmonary melanosis

A carpenter, sixty-eight years of age, felt an habitual difficulty of breathing since the last five or six months; he is out of breath when he walks; this state

came on gradually without being preceded by any acute disease. The patient never felt any thoracic pain. He entered the hospital January 12: he was weak, pale, and very thin; breathing short, hurried; pants when speaking; cannot lie in the horizontal position. Chest, when percussed, sounds but very feebly on the right, from the clavicle to the breast; in this same space the respiratory murmur is clear, but weak. On the left the sound is very dull in the supra and infra-spinous fossæ, as also laterally and anteriorly, in the space between the clavicle and breast; on approaching the sternum at this level the dulness diminishes. The respiratory murmur absent where the sound is very dull; it is heard feebly, but without any rale, near the sternum. Over all this space, the voice exhibits a resonance which it has not elsewhere; the real tremor, however, which constitutes ægophony is not heard. In the other points of the thorax, that is, over the site of the two lower lobes, the sound is clear, and the respiratory murmur very intense. Cough not frequent, expectoration not profuse, and is catarrhal; pulse frequent and irregular: no feverish heat of skin, digestive functions intact. (Blisters over the left side of the chest.)

On the 13th, signs of gastro-intestinal inflammation, tongue red and dry; abdomen tympanitic and painful; diarrhœa; pulse more frequent, and skin hot. (Twenty leeches to the anus.) 14th. Slight delirium; tongue less red, and is now moist; great dyspnœa. (Twenty leeches to the neck; two blisters to the legs; ptisans and emollient lavements.) More leeches both to the neck and anus, and also sinapisms to the legs; but the patient continued to sink, and died on the 22d.

Post-mortem. Marasmus; some œdema of the dorsal surface of the left hand. Left side of the chest, from the first to the fifth or sixth rib, was occupied by a limpid, colourless liquid, which pushed the upper lobe of the lung of this side towards the mediastinum. The cavity which contained this liquid was limited inferiorly by false membranes, which extend from the ribs to the lung, and form a sort of septum which divides into two parts the cavity of the left pleura. The lung was lined by false membranes remarkably thick and firm. Their appearance presented considerable resemblance to that of inter-articular cartilages; in several points they present small nuclei of osseous substance. The upper lobe of the right lung presents a considerable number of small masses of a dull white, having the consistence of chalk soaked in water, and of a stony hardness in some points. Around these depositions of calcareous phosphate, the pulmonary substance was black as charcoal, very hard, and very difficult to be torn; in other parts the pulmonary tissue greyish, and engorged with a great quantity of frothy, colourless serum, was still pervious to the air. The melanosed parts occupied at least two-thirds of this lobe.

A small ulceration of the stomach in the middle of the great curve. The edges of this ulceration were formed of mucous membrane, which was white, and a little softened.

Nearer the great cul-de-sac there was a small rounded tumour, the size of a large pea, covered by the mucous membrane, which had remained intact beneath it; it was developed in the submucous tissue, and presented all the characters of tuberculous matter in the state of crudity. Liver small and easily torn. A considerable quantity of serum infiltrated the sub-arachnoid cellular tissue; there was some also in the lateral ventricles and spinal canal.

The seat of the effusion and its exact circumscription very well account for the signs afforded by auscultation and percussion. The existence of the dull sound, and the absence of the respiratory murmur in the upper lobe, should incline one to suspect rather pulmonary hepatisation than an effusion into the pleura. Over all the extent of this effusion the voice presented greater resonance than elsewhere; now this phenomenon is also found in the case of hepatisation. Finally, the pain which ordinarily marks the onset of pleurisies, was totally wanting in this case.

It is important to remark, not only as a fact of pathological anatomy, but also as a circumstance which may modify the treatment, the nature of the false membranes which lined the lung. They formed a kind of real plastron, which, keeping the lung fixed in the narrow space into which the effusion had forced it, would not have allowed it to expand and return to its original volume, if the liquid contained in the pleura had been either absorbed or evacuated through the thoracic parietes. In some similar cases we tried in the dead body to inflate the lung, after previously evacuating the effused liquid; but we failed. This is one of the circumstances which may sometimes prevent the success of the operation of empyema; it is probably, also, in cases of this kind, that after the gradual absorption of the effusion, the lungs not being able to approximate the thoracic parietes, the latter were depressed in order to approximate the lung.

CHAPTER IV.

DOUBLE PLEURISIES WITH OR WITHOUT EFFUSION.

The simultaneous inflammation of the two pleuræ is always a very serious disease. It is so much the more dangerous, as it may be easily overlooked. In fact, as has been already well observed by M. Broussais, it is only in the smallest number of cases, that its commencement is marked by the acute, circumscribed, characteristic pain, which usually announces the commencement of pleurisy. It may produce death very rapidly, before any effusion has taken place, by the mere fact of its extent, and by the extreme dyspnœa which it occasions. When the effusion occurs on both sides at the same time, the equal diminution of sonorousness on the right and left, prevent us from ascertaining, by percussion, the existence of the double collection. In this case, on the contrary, auscultation afford valuable information. We may readily conceive how great the danger must be, however inconsiderable the effusion. If it take place rapidly, it is infallibly fatal in a very short space of time; if it take place but slowly, or successively, first on one side, then on the other, the case is not dangerous, and the patient may recover. If in this case the disease terminate fatally, this termination may be prompt, as in the preceding case; but the disease may also assume a chronic course, and not terminate in death until after a very long time. Death seems to supervene, then, principally because the two lungs, compressed more or less forcibly, are no longer able to admit the quantity of air sufficient to produce a perfect hematosis: the results of which are marasmus, and the progressive deterioration of all the functions.

Case 19.—Double pleuritis without effusion.

A tailor, thirty-nine years of age, presented all the symptoms of an aneurism of the heart, when he entered the hospital in the month of October. The legs alone were infiltrated. The lungs and their appendages appeared healthy; a frequent cough of long standing, with expectoration of opaque mucus, announced merely a chronic inflammation of the bronchial mucous membrane. The respiration, which was very much embarrassed at the time of the patient's admission, became freer after some days, and the œdema of the lower extremities disappeared. On the 3d of November, without any known cause, the respiration became suddenly accelerated. On the 4th he presented the following state: his face was pale, and expressed the most intense anxiety; the muscles of the face presented from time to time slight convulsive movements. He was half sitting up in his bed; inspiratory movements very short and frequent; he pronounced some words with difficulty and with panting. Properly speaking, he

complained of no pain ; but the entire chest was the seat of a very painful sensation, which he compared sometimes to a weight which smothered him, sometimes to a forcible constriction made on the thoracic parietes, and which was opposed to their dilatation. The respiratory murmur was heard every where very distinct, but weak ; the chest also sounded well in every part. The pulsations of the heart presented nothing new. Cough not frequent ; character of the expectoration not changed ; pulse exceeded 130 ; the skin was hot and dry, tongue whitish, abdomen free from pain, evacuations natural. What was the cause of this extreme dyspnœa, which appeared all at once with great alteration of the features, intense anxiety, and extraordinary frequency of the pulse, etc. ? Did this cause reside in a momentary exasperation of the heart disease, in a pericarditis, in a diaphragmatic pleurisy ? On this subject we could only form conjectures more or less probable. Here, however, whatever the cause of the symptoms might be, the indication was obvious. (He was bled to twelve ounces, fifteen leeches were applied to each side of the chest, mustard pediluvia, emollient drinks.) The blood taken from the vein presented a dense clot, which was buffed and surrounded by a great quantity of serum. After the bleeding, the dyspnœa was less for some time ; but it soon reappeared as before. In the evening and night he raved.

On the morning of the 5th of November, intellect still disturbed. The inspiratory movements, which were extremely short and very frequent, were performed principally by small, abrupt, and as it were convulsive contractions of the diaphragm. (Blisters to the legs.) A little time after the visit, the patient was seized with violent hiccup ; the respiration, which was still shorter and embarrassed, was finally arrested, and death took place in the evening.

Post-mortem. The two pleuræ, through their entire extent, presented a bright red injection, which made them appeared streaked with myriads of extremely delicate vessels, which crossed each other in different directions. In some places, they were covered with small albuminous concretions, sometimes extended like false membranes, sometimes deposited in isolated points in the form of miliary granulations. There was also in the right pleura, about an ounce of greenish, slightly turbid serum. The parenchyma of both lungs was very healthy, slightly engorged. The heart presented hypertrophy of the parietes of the two ventricles, with dilatation of their cavity. The aorta was remrkable for its extreme narrowness. The organs of the cranium and abdomen appeared healthy.

The double pleuritis, in this case, was the cause of that group of frightful symptoms not satisfactorily accounted for during life. What is peculiarly remarkable here is the absence of all pain, notwithstanding the extent and intensity of the inflammation ; we mean the great dyspnœa, notwithstanding the free entrance of the air into the pulmonary vesicles, as well as the great rapidity with which death supervenes, though no organ essential to life was injured. Thus persons attacked with peritonitis often die in twenty-four hours. So extensive and acute an inflammation could not exist without sympathetically affecting the nervous system ; this accounts for the convulsive movements of the face, as well as for the delirium. We may remark the peculiar mode of respiration, the convulsive-like contractions of the diaphragm, and finally the hiccup.

This example suffices to prove the great obscurity of diagnosis in double pleurisies, and the great danger with which they are attended, even before there is any effusion.

Case 20.—Double effusion formed without pain—Particular nature of the effusion on the right side.

A coachman, sixty years old, entered the hospital in the July of 1822. For some months back he had pains in one of the dorsal and lumbar regions. The

vertebral column presented nothing unusual; the extremities had their natural strength; no fever. Leeches were applied several times to the seat of pain, which was diminished; but the two lower extremities soon became debilitated and were the seat of habitual numbness. Two moxas were applied to the loins. The weakness of the upper extremities still increased; there was not, however, complete paralysis, and at the beginning of October the patient was still able to support himself on his legs. He now had some fever, and gradually wasted. But then new symptoms manifested themselves: the breathing was unusually difficult. The chest, when percussed, yielded a dull sound in the lower third of the left side; the respiratory murmur was much weaker there than elsewhere, and the voice in this same part presented a peculiar resonance. A large blister was applied over the left side. The next day, 15th of October, the respiratory murmur was entirely absent over this side; ægophony was no longer heard. The sound was dull from the clavicle and spine of the scapula to the base of the chest. The breathing was short and hurried; cough rare; expectoration gone. It was thought the left pleura was the seat of a considerable effusion.

On the 16th the dyspnœa and general anxiety were much greater than on the preceding days. On the left auscultation and percussion gave the same information; but anteriorly on the right, on the level of and below the breast, the sound was become dull; the respiratory murmur, which on the preceding day was very intense in this point, was scarcely heard there, and there was a very well-marked tremor of the voice. Posteriorly on this same side, the respiratory murmur was very well heard, without any change of the voice, or diminution of the sound. On the 17th and 18th dyspnœa still increasing; profuse diarrhœa. Died on the 19th.

Post-mortem. A turbid greenish liquid, mixed with a great quantity of albuminous flocculi, was found in the two pleuræ; but the effusion was deposited not in the same manner on both sides. On the left the liquid was, as usual, in contact with the ribs, and had pressed the lung on the lateral parts of the vertebral column. On the right, on the contrary, the lung remained in contact with the ribs, as well posteriorly as laterally; a purulent liquid separated it both from the diaphragm below, and from the anterior mediastinum internally. False membranes, soft, and traversed by numerous vessels, lined both pleuræ.

An enormous quantity of white phlegmonous pus existed in the abdomen, on each side of the vertebral column, from the last dorsal vertebra to the fifth lumbar. Over this extent the psoas muscles had been as it were dissected by the pus. On the left the purulent collection did not pass beyond the ileo-vertebral articulation; on the right it extended into the iliac fossa. The lateral surface of the body of the first lumbar vertebra was rough, unequal, and divested of its periosteum. The intervertebral fibro-cartilage was entirely destroyed; the corresponding surfaces of the body of the two vertebræ were rough and blackish. The spinal marrow and its coverings presented no appreciable lesion, nor did the brain.

The double effusion in this case formed successively. The pain did not announce it on either side; the collection on the left side had been in existence probably for some time when we observed some dyspnœa. It appeared to have formed slowly, and the respiration did not appear to be perceptibly embarrassed until it was now considerable. The dyspnœa did not become very intense, and the general symptoms did not really appear dangerous until some pus began to be effused also into the right pleura. But this latter effusion differed from the other, and from the ordinary cases, in occupying only the anterior part of the cavity of the pleura, and in pressing the lung directly backwards, instead of inclining it towards the vertebral column; thence the existence of the dull sound, and of the ægophony at the anterior part of the thorax.

We may notice in this case —

1st. The existence of a copious diarrhœa towards the close, without any apparent trace of intestinal inflammation; 2dly, the incomplete paralysis of the lower extremities, which recognised as its cause no appreciable lesion of the spinal marrow. It may be presumed that the nerves, bathed as they were in pus, had undergone some lesion which prevented them from completely transmitting the faculty of sensation and motion to the lower extremities.

CHAPTER V.

PLEURISIES COMPLICATED WITH OTHER DISEASES.

The most common complication of pleurisy is inflammation of the pulmonary parenchyma. We shall recur to this complication only in a very secondary manner; numerous examples of it are contained in the section which treats of pneumonia.

Case 21.—Pleuritic effusion, with pneumothorax and pulmonary and intestinal tubercles.

A German, thirty-five years of age, had been labouring under a cold for several months, when he entered the Charité. He then presented all the characters of pulmonary phthisis in the second stage.

About fifteen days after his admission, on the night of the 11th, he was suddenly attacked with an acute pain below the left breast. At the same time there was extreme difficulty of breathing. On the 12th, continuance of the pain; slight crepitous rale posteriorly on the left, on a level with the inferior angle of the scapula; in every other part the respiratory murmur was loud and clear; pulse hard, frequent; skin hot. (Twenty-four leeches to the side.) One hour after the visit, the patient expectorated a great quantity of frothy vermilion-coloured blood.

On the 13th, a continuation of the hemoptysis. (Bleeding to ten ounces.)

14th and 15th, hemoptysis ceased; pain gone; dyspnœa and fever continue.

On the 16th, the patient who, on the preceding days, had observed a rigorous diet, took some *potage au riz;* this had scarcely reached his stomach, when the hemoptysis reappeared. (Bleeding to six ounces; blister to one thigh; strict regimen.) The spitting of blood ceased in the course of the day.

Up to this period the chest, when percussed, presented its natural resonance in every part; respiratory murmur heard everywhere distinct, except on the left in some points, where a mixture of the mucous and crepitous rale was heard, probably the result of the presence of some small tuberculous cavities. May 17th, a new phenomenon engaged our attention. The respiratory murmur was no longer heard posteriorly on the left, though over this same extent the sonorousness of the chest was much greater than on the right, which had not occurred on the preceding days. M. Lerminier announced the very probable existence of pneumothorax. Mere emphysema, in fact, would not have occasioned the absence of the respiration to so great an extent.

On the day after, there was also under the left clavicle a complete absence of the respiratory murmur, and at the same time great sonorousness.

Up to the 28th, the patient, examined every day, presented no change with respect to percussion and auscultation. The dyspnœa was always considerable cough frequent; the expectoration was three or four times bloody. An obtuse pain was felt from time to time on a level with the left breast. Profuse sweats every night.

28th. On percussing the chest, the patient sitting up, we discovered for the first time the existence of a dull sound on the left posteriorly, from the inferior part of the scapula to the base of the thorax. On practising succussion, ac-

cording to the method of Hippocrates, there was heard the passing of a liquid on the left side of the chest. From this time we no longer had any doubt of there being a mixture of air and of liquid in the left pleura.

In the course of the month of August, the increase of the dull sound and the slight separations of the ribs announced the progress of the effusion. This fluctuation of the liquid was still heard. Ægophony was never perceptible; general state less and less satisfactory; features very much altered. Copious perspirations, which we endeavoured, though ineffectually, to moderate with pills of acetate of lead; diarrhœa since the beginning of August.

In the beginning of September, the fluctuation ceased to be heard. The sound was very dull on the left, both posteriorly and laterally, to a little above the middle of the scapula. Higher up, both posteriorly and anteriorly, the chest sounded, but less than on the right. At this period we heard posteriorly a peculiar resonance of the voice, which approached very closely to ægophony.

On the 10th of September, the patient's ideas became very confused. On the 11th, he raved; pulse very frequent and very weak. On the 12th, the patient's four extremities became as cold as if he had been dead for the last twenty-four hours. He died on the following morning.

Post-mortem. The thorax appeared a little more prominent on the left than on the right; the left side, when measured, was accordingly found to be larger by five lines.

A slight incision having been made at one of the upper intercostal spaces of the left side, no sibilous noise was heard, no air-bubble escaped; a litre and half of lemon-coloured serum, mixed with albuminous flocculi, filled the left pleura. Both the costal and pulmonary surfaces of this membrane were lined with albuminous concretions extended into false membranes. Some adhesions, rather solid, forming bands more than two inches long, united the apex of the lung to the ribs. The lung, which was very much compressed, was easily dilated with air blown into it. It, as well as the right, contained numerous tubercles, many of which were softened. Several tubercular lymphatic ganglions existed in the anterior mediastinum. Some crude tubercles were scattered under the intestinal mucous membrane. A greater number were already softened, and had ulcerated the mucous membrane. The mesenteric ganglia were tuberculous. Brain and its coverings remarkably pale; much serum in the lateral ventricles.

Did a gaseous effusion really exist in the pleura of this patient? We can scarcely question it, we think. By the mere existence of the pneumothorax may be explained several of the phenomena observed at different periods. It is thus, in our opinion, that these lesions succeeded each other, and thus we may explain by what group of symptoms each of them was announced. First, the appearance of the pain of side announced the coincidence of an inflammation of the pleura with hemoptysis. This inflammation gave rise at first to no effusion, as was indicated by the sonorousness and natural respiratory murmur being preserved. Subsequently this murmur ceased on a sudden to be heard over a great extent, and at the same time the sonorousness of the chest, far from diminishing, became greater than on the opposite side; the existence of a gaseous effusion into the pleura already inflamed then seemed evident. At a later period, the sound became dull interiorly, and on employing the hippocratic method of succussion, a liquid was heard on the left side of the chest. Now, such a phenomenon only supervenes where there is a mixture of air and liquid. The existence of the pneumothorax was even rendered still more evident by this new sign; but further it, together with the dull sound, announced the commencing of a liquid effusion into the pleura. This latter effusion increased still more, and according as it became still more profuse, the fluctuation of the liquid is no longer heard. From this we thought that the liquid effusion had entirely succeeded the gaseous effusion, whether the latter had been absorbed, or whether

the aëriform liquid, subjected to greater or less pressure, has dissolved in the liquid. In fact, the *post-mortem* examination showed nothing in the pleura but the ordinary purulent collection; we should remember that in the last period of life the respiration was still heard a little superiorly and posteriorly, and that the sound was also less dull there. In this space the lung, being kept near the ribs by long bands, could have allowed but a very thin sheet of liquid to interpose itself between it and the thoracic parietes.

In this case, the nature of the lesions was so clearly indicated by the nature of the symptoms, that the examination of the body, made with the view of verifying the diagnosis, became almost superfluous.

This case presents to us the very rare instance of an effusion of gas into the pleura, without there being any communication between the cavity of this membrane and the exterior. Here the gas appears to have been a product of the exhalation of the serous membrane. Most frequently, on the contrary, pneumothorax is the result of a communication set up mediately or immediately between the bronchi and the cavity of the pleura.

CHAPTER VI.

RECAPITULATION; OR, GENERAL HISTORY OF PLEURISY.

146. In this recapitulation we shall follow the same course as that adopted in treating of pneumonia. Thus, we shall first state the anatomical characters of inflammation of the pleura; we shall then speak of the causes of pleuritis, of its symptoms, of its course, of its varieties, &c.

147. The pleura, when attacked, presents — 1st, alterations of tissue; 2dly, alterations of secretion. Besides, the lung, when compressed or displaced by the effusion, presents varieties of form, size, situation, and relations, which it is important to know. When a foreign body is introduced into the pleura of an animal, or a liquid somewhat irritating is injected into it, and if the pleura be examined a little time after, it is found to be red to a greater or less extent; but a careful examination soon shows that this redness is solely owing to the greater or less injection of the vessels which pass over the sub-serous cellular tissue: the membrane itself has retained its transparence, and no red vessel ramifies through it. The same phenomena may be observed in persons who, labouring under slight pleuritis, die of another disease. Should the inflammation be more intense, the serous membrane itself then presents vessels in greater or less number filled with blood; sometimes these vessels, not being very numerous, leave great intervals between them, and they scarcely disturb the transparency of the membrane; sometimes their number is greater, they become agglomerated, anastomose in a thousand ways, and so as produce mere points, long streaks, large patches, and, finally, a red tint to a greater or less extent; this last case is very rare. We still preserve in a state of dryness portions of pleura which present these different degrees of vascular injection. These different shades of inflammatory redness must not be confounded with the product of simple ecchymosis; sometimes, after chronic diseases, or certain severe fevers, effusions of blood merely passive take place on the external surface of the pleura, and peritoneum, in the same manner as they are formed under the mucous membranes and under the skin. Very little care is necessary to distinguish these ecchymoses from an inflammatory injection.

In the majority of cases, the pleura, red or white, opaque or transparent, is not increased in thickness; we very rarely find it really thickened. The authors

who have spoken of thickening of the serous membranes as a very common pathological phenomenon, evidently confounded the serous membrane itself with the false membranes which covered it.

The peritoneum, when inflamed, often loses a great part of its consistence; it becomes softened and ulcerated. We never have observed anything similar, with respect to the pleura. We have sometimes seen it detached from the pulmonary surface with much more ease than in the healthy state, as if the fine cellular tissue which unites it to the lungs had participated in the inflammation and become friable. Thus, in enteritis, when the inflammation has extended to the sub-mucous tissue, the latter may be raised to a great extent without being torn.

The alterations of secretion presented by the inflamed pleura are more numerous and more varied than its alterations of tissue; but what is here remarkable is, that, in several cases where these alterations of secretion are most marked, the membrane presents no appreciable change in its texture. The serous liquid exhaled by the pleura in the healthy state is modified both with respect to its quantity and its qualities.

Its quantity may vary from less than an ounce to several pints. When this quantity is very considerable, not only is the lung so compressed as to occupy the least possible space, but the diaphragm also is pressed down, the result of which is a very considerable prominence of the abdominal viscera, and particularly of the liver on the right side, and of the spleen on the left. Stoll says that he saw the diaphragm so depressed in a case of this kind by a collection in the pleura, that a very perceptible tumour was occasioned by it in the hypochondrium. The ribs are separated, the intercostal spaces enlarged and bulging outwards very much; the mediastina also undergo some displacement, and deviate towards the side opposite to that on which the effusion exists. Lastly, in cases where the left pleura was the seat of the collection, the heart itself has been seen to lose its usual situation, to be direct to the right side, and its apex to approach so near to the sternum, that during life its pulsations are no longer heard except behind this bone and in the right part of the thorax. We have not had an opportunity of observing more than one case of the kind.

The liquid exhaled by the inflamed pleura presents a multitude of varieties; we shall here mention the principal of them.

There are cases wherein there is found only colourless or lemon-coloured serum, perfectly limpid and transparent. The slight redness of the serous membrane, the small number of membraniform concretions which line it, are then the only signs, often but very indistinct signs, by means of which inflammation may be detected, the existence of which had been indicated during life by unequivocal symptoms. At other times, and this is a more common case than the preceding, in the midst of a liquid, which always remains limpid, some albuminous flocculi are seen to float, the greatest part of which is thrown down. Most frequently these albuminous flocculi, more abundant, tend to become dissolved in the serum, and disturb its transparency. In other persons there is found a liquid decidedly turbid, of a yellow, green, brown, or greyish colour, which is sometimes very thick, and as it were muddy. In fine, after several intermediate states, this liquid presents itself under the form or real pus, such as it exists in a phlegmonous abscess. In some rare cases, the pleura is filled with a peculiar liquid, which is neither serum nor pus; this liquid, usually deposited in compartments formed by false membranes, resembles either animal jelly half liquefied, or honey, or, better still, the matter contained in external tumours, known by the name of *meliceris*. Blood may also be effused into the inflamed pleura; but sometimes the red colour of the liquid is so light, that it seems to be merely serum mixed with a small quantity of the colouring matter of the blood. Sometimes, on the contrary, the pleura is found filled with a liquid altogether resembling the blood which comes from a vein;

real fibrinous clots still united to the colouring matter of the blood, or deprived of this matter, are collected towards the most depending part of the pleura. It cannot be doubted in this case but that natural blood was really exhaled by this membrane. The peritoneum, attacked with inflammation, also presents to us frequent instances of a similar sanguineous exhalation.

The different liquids effused into the pleura are always inodorous, unless a solution of continuity of the thoracic parietes or a pulmonary fistula establishes a communication between the cavity of the pleura and the exterior.

Aëriform fluids sometimes exist in the inflamed pleura, either alone, or more frequently mixed with a liquid. Their presence is principally ascertained — 1st, by the hissing noise produced at the moment an incision is made into the ribs; 2dly, by the frothy state of the liquid. We might also satisfy ourselves of it by opening the thorax in water. In some circumstances these gases are evidently the product of an exhalation of the membrane; but most usually they are found in the pleura only when the latter communicates more or less immediately with the bronchi.

A portion of the liquid exhaled by the pleura naturally tends to concrete and pass into the solid state. Thence the false membranes which present so many varieties with respect to their organisation, form, colour, extent, consistence, and thickness.

One of the most curious phenomena of pathological physiology, is, no doubt, that of the organisation of false membranes. An amorphous liquid (*the coagulable lymph of Hunter*) is deposited on the free surface of the pleura; it is scarcely exhaled when it becomes solidified; it is first a soft and whitish substance, and is divided into a number of filaments which, by their interlacing, constitute a species of meshes, whence some serum is expressed. But a little time signs of vitality manifest themselves in this apparently inorganic substance; red points are developed in it; these points, which are at first but few in number, and isolated, multiply, become lengthened into lines or reddish striæ, which traverse the surface of the albuminous concretion; at last these striæ become real vascular canals, which soon get clear of the concretion wherein they were originally formed, join the vessels of the pleura, and then establish a communication between the circulation of the false membrane and the general circulation. Experiments on living animals, as well as observations on man also, have proved that this process of organisation sometimes takes place with incredible rapidity. In rabbits, whose pleuræ we had irritated artificially by injecting acetic acid into them, we found, at the end of nineteen hours, soft, and very delicate false membranes, traversed by numerous reddish lines, which anastomosed like real vessels. On other rabbits whose pleuræ had received the same liquid, and which seemed to be placed in the same circumstances as the preceding, we found nothing similar at the end of a much longer time. Their pleuræ contained nothing but a serous or purulent liquid, with a mixture of albuminous flocculi entirely inorganic. We repeated the same observations on man. We met, for instance, false membranes which were already vascular in persons who died of a pleuritis at the end of a very few days. We saw no trace of them in other patients who had not died till after the lapse of several months. The organisation of false membrane does not depend then merely on the longer or shorter time which elapsed since their formation, and no general rule can be laid down with respect to the moment of which this organisation commences. It would appear that in this respect there are inexplicable individual predispositions, which in some accelerate the period of the process of organisation, and which in others retard it. We may remark here, *en passant*, that the greatest analogy exists between the mode of development of the vessels of false membranes, and their mode of production in the membrane of the yolk in the chick. We should note, however, a remarkable difference — namely, the inconstancy and irregularity of organisation in the false membranes,

and, on the contrary, the constancy and regularity of this process in the membrane of the yolk.

The form of the false membranes of the pleura is very variable. Oftentimes they are miliary granulations separated from each other, and which might be readily taken for small tubercles, did they not differ in their intimate texture. This species of false membranes, which appear to be produced by a coagulable liquid deposited on the surface of the pleura in separate small drops, frequently co-exists with an effusion of limpid serum. At other times the pleuræ are covered to a greater or less extent, and even through their entire surface, by large concretions, which considerably increase their thickness. The surface of these concretions, more or less perfectly organised, is sometimes quite smooth and polished, sometimes rough, uneven, and mamillated, sometimes again traversed by very delicate filaments, which, by their interlacement, give it an areolated appearance. In a very considerable number of cases these concretions are elongated into bands, variable in form, size, and density, which extend from one of the surfaces of the pleura to the other, and constitute adhesions oftentimes remarkable for their length; these adhesions traverse a great quantity of liquid in order to unite the pleuræ costalis and pulmonalis. Sometimes, being very numerous, they interlace in the midst of the liquid, and enclose it in a sort of compartment or cells, more or less regular, which they leave between them. Even when there is no more liquid effused, the pleuræ costalis and pulmonalis are at times found united by long bands, which allow the ribs to be separated from the lung to the extent of from one to two inches without laceration. The function of this organ would even be singularly interfered with if, in all cases, the adhesions set up between the two surfaces of the pleura did not allow the latter to separate a little from each other. In fact, every time that anything like a deep inspiration takes place, the relation of the ribs and lung changes; whilst the former are raised the second descends, and consequently each of the points of the lung is no longer in contact with the same point of the thoracic parietes. We may satisfy ourselves of this fact by exposing an intercostal space in an animal.

Adhesions which are soft, easily torn, and of an albuminous appearance whilst they are recent, become changed sooner or later into a real cellular tissue, which establishes an intimate union between the two surfaces of the pleura. It is in this state they are found in persons who have had old pleuritic affections.

Are the cellular adhesions of the pleura ultimately absorbed? We know no direct fact which proves it; but analogy would lead us to admit it. Beclard has cited a case which demonstrates the possibility of such an absorption of the cellular adhesions of the peritoneum; also, in this latter membrane, as in the pleura, adhesions may exist to a great number without giving rise to any morbid phenomenon. We found in an individual who several years before had had the symptoms of a peritonitis, all the convolutions of the small intestines united by a cellular tissue sufficiently loose to allow of a slight friction between them. This individual, during a long stay in the hospital, never complained of any pain or of any feeling of constriction in the abdomen. With respect to the cellular adhesions of the pleura, they are so well known to be harmless, that it is perfectly useless to dwell longer on this point.

False membranes are most frequently colourless; often also the yellow, grey, or red tint which they present, is communicated to them by the liquid with which they are in contact. It is not uncommon to find the peritoneum covered with false membranes of a deep black colour. We never met such a colour in the false membranes of the pleura.

Their thickness is sometimes not greater than that of the pleura itself. They are raised from the surface of the latter in the form of very fine pellicles, entirely resembling the tissue of the pleura. Often also several of them are laid one over

the other, which are removed in successive layers ; it might then be supposed that it is the pleura itself which is composed of several laminæ. The existence of false membranes of this kind may also be very readily overlooked. We never met them except in cases of chronic pleurisy. They are found more commonly still on the surface of the peritoneum under the same circumstances.

However, in the majority of cases, the thickness of false membranes far exceeds the natural thickness of the pleura ; this thickness appears at first sight so much the greater, as there are always several false membranes laid one over the other ; they then often acquire such solidity and density, that they double in a manner the thoracic parietes, and so that when a more or less extensive portion of these parietes has undergone a solution of continuity, they may supply these same parietes, forming a sort of breast-plate (*plastron*), which sufficiently secures from external violence the organs contained in the thorax. These false membranes, when applied over the lung which has been separated from the ribs by an effusion, form a barrier which prevents the lung from returning to its original state after the effusion has been absorbed or evacuated. As we have already seen, this barrier may even oppose an invincible resistance to the efforts made after death to distend the lung by inflation.

In the very great majority of cases where an effusion exists in the pleura, whether it has been announced or not during life by pain, fever, or other signs of inflammation, we find in the pleura evident signs of inflammation derived from the presence of false membranes, from the nature of the effused liquids, or, in fine, from the appearance of the pleura itself. Thence we must conclude that the effusion of serum into the pleura, without previous inflammation or without mechanical obstacle to the circulation, is an extremely rare disease. Even in the case of heart disease, hydrothorax appears much less common than ascites.

Accidental tissues of different kinds are frequently developed in the inflamed pleura. Thus false membranes sometimes pass into the fibrous, cartilaginous, or even bony state ; but the accidental tissue most frequently developed there is certainly the tuberculous tissue ; our cases have given numerous instances of this. These tubercles arise even in the midst of false membranes ; they are ordinarily very numerous, and appear often to multiply with great rapidity. We have found false membranes already filled with tubercles in persons who had died of pleurisies, the duration of which had not exceeded fifteen days. The rapidity of such a development is not a phenomenon devoid of analogy : we have elsewhere cited several cases, which prove that the different accidental tissues, which, in the most ordinary cases, are developed slowly, and are characterised by the symptoms of a chronic disease, arise and increase in some cases with an astonishing rapidity, and produce an acute affection. We shall here cite two cases of this kind, in which, after a slight peritonitis, cancerous tumours in one case, and tuberculous tumours in the other, were developed, and attained an enormous size in a very short space of time.

A military man, fifty-one years of age, entered La Charité, complaining of rather severe pains around the umbilicus for the last eight days ; there was a little fever ; stools natural, as also the tongue ; the day after the abdominal pain was increased ; countenance altered ; pulse frequent and small ; peritonitis more marked. (Leeches were applied.) Subsequently the abdominal pains were somewhat lessened, but the abdomen began to swell ; there was, however, no manifest fluctuation ; the abdomen, when percussed, yielded a dull sound, whence we could not refer the tumefaction to the development of gas in the intestines. Some few days after we detected an irregularly rounded, very moveable tumour, extending from the umbilicus to the pubis ; this became still more perceptible, and we were soon able to trace it into the iliac region and into the flank of the same side, where it presented a great number of knobs, and was much more painful than around the umbilicus. From a fortnight to

three weeks after this the pains became excruciating, and we found the tumours evidently larger every morning than the preceding day. Delirium now set in and the patient died.

On opening the body, we found the umbilical region, the two flanks, the hypogastrium, and the two iliac fossæ, occupied by a tumour inserted above into the colic edge of the stomach, concealed below by the pubis, over which it was prolonged.

When detached from the stomach and turned from above downwards, this enormous tumour showed behind it the arch of the colon to which it adhered, the small intestines covered with membranous exudations, the cæcum, as also the ascending and descending portions of the colon. It was very hard, thick, rough, and studded on its surface. When cut into it presented all the appearance of scirrhus in the crude state; in other points small cavities were formed, some of them round, some oblong, and others anfractuous. (Scirrhus in a state of softening.) With this tissue also there was intermixed another tissue of an opaque white (encephaloid tissue in the crude state); in two or three points only there existed a pulpy, reddish substance, resembling cerebral matter when beginning to putrify (encephaloid tissue in the state of softening); and, lastly, in some places the white colour of the preceding tissues was mixed with rather a deep brown colour, indicating probably the commencement of melanosis.

The above fact has but few analogous to it in the annals of science. Thus, in the space of less than five weeks after a slight peritonitis, a cancerous tumour attacked the epiploon, acquired every day an increase perceptible to the eye and touch, and doubled in a manner the entire anterior lining of the abdomen.

In this patient, the acuteness of the pains and of the fever, and his frightful wasting, were proportioned to the rapidity of development of the accidental tissues. In the following individual, who will present to us the instance of a tumour whose growth was still more rapid, we observed neither pain nor fever, and the strength also was rather well retained.

A tailor, twenty years of age, of a lymphatic temperament, an inhabitant of Paris for the last seven months, worked and slept during January and February on a moist ground floor; towards the middle of February he observed his abdomen to become unusually large; no pain; wasting of the face and limbs; towards the beginning of March, profuse diarrhœa; abdominal pains increased on pressure; appetite lost; strength diminished. During March, diarrhœa appeared and disappeared several times; size of abdomen increased. He entered the Charité in the beginning of April, and presented the following state: —

Countenance pale; emaciation of the limbs; abdomen large, and painful only on considerable pressure; fluctuation evident; only one liquid stool in the twenty-four hours for several days; no fever; breathing free.

The ascites was considered by M. Lerminier as the result of latent inflammation of the peritoneum. To remove the inflammation, and effect the absorption of the effused fluid, — such were the indications to be fulfilled. (Leeches to the abdomen and anus; venesection; emollient fomentations; diuretics and diaphoretics were prescribed.)

Under this treatment the ascites lessened and the urine became more copious and clearer; the skin was moistened but once.

On the 20th of April, fluctuation no longer perceivable; but we easily discovered, on feeling the abdomen, that the small intestines were united into a single mass.

Nothing now occurred from this time up to the 7th of May. The patient found himself much better than at the time of his admission, notwithstanding the great losses of blood.

On the 7th of May, a large mercurial plaster was applied to the abdomen; no pain felt; patient walked about and was free from fever. We were astonished

on the 21st, when, on raising the plaster, we found, instead of the intestinal convolutions, a large tumour occupying the umbilicus, the lower part of the epigastrium, the left flank, the hypochondrium of the same side, which seemed also to be prolonged behind the false ribs of the left side. This site of the tumour gave it considerable resemblance to the enlarged spleen. However, no cause could account for this rapid development of the spleen ; on the contrary, we know that the great epiploon might very rapidly acquire an enormous size. The absence of fever also seemed to confirm our diagnosis, as in this individual an extensive peritonitis had also been developed without pain and fever.

The patient, convinced that he was convalescent, left the hospital on the 1st of June. On the 2d of August, he returned in the most deplorable state ; since his going out the symptoms of pulmonary phthisis had declared themselves. The abdominal tumour had very much increased ; it was hard, and studded with a great number of knobs. He died four days after his return.

On opening the body, we found that the great epiploon had attained at least eight or ten times its natural thickness. This increase of thickness was owing to large tuberculous masses developed between the laminæ of the epiploon ; several were beginning to soften. Most of the mesenteric ganglions were also tuberculous. Behind the epiploon the small intestines were observed connected together by false membranes, in the substance of which enormous tubercles were also developed. Immense tuberculous cavities in the two lungs ; the other viscera were healthy.

Let us recapitulate in a few words the different phases or periods of this interesting disease.

First period. — Development of peritonitis without pain and without fever.

Second period. — Ascites, the result of peritonitis ; disappearance of the serum under the influence of copious bloodletting.

Third period. — Organisation of the albuminous flocculi, which, not being absorbed, as in the serum, were changed into false membranes. Adhesion of the intestines easily recognised through the abdominal parietes.

Fourth period. — Very rapid formation (in fourteen days) of the tuberculous tumour of the epiploon ; still the general state of health excellent ; return of strength ; total absence of fever ! . . . . In this state the patient left the hospital : he observed no particular regimen, and under the influence of the irritating causes to which he was subjected, the process of *tuberculisation* increased in the peritoneum and extended to the lungs, hectic fever was lighted up, and the patient sunk rapidly.

When this young man left the hospital, no symptom indicated any affection of the lungs, and in less than two months the pulmonary tubercles increased, softened, and formed large caverns.

It is very evident that in the different cases which we have cited, and particularly in the case where tubercles were developed within false membranes, the formation of accidental tissues was consecutive to an inflammatory state. It appears to us very reasonable to admit that inflammation, having a tendency to modify the texture of the parts which it attacks, and to alter their mode of nutrition, must for that same reason favour the production of the accidental tissues ; but observation also obliges us to add that this production only takes place as far as there is a predisposition on the part of the individual ; for how often do we find no trace of these tissues, though the patients had suffered long and violent inflammations, whilst in others we find these same tissues to be produced after the slightest irritation ?

The different modes of alteration now described may exist in both pleuræ at one and the same time, or in one only ; the inflammation even may occupy only a more or less accurately circumscribed portion of a single pleura. It often happens, for instance, that an effusion is limited and confined to a small space by false membranes variable in form and thickness. The portion of pleura lining

the diaphragm, that which extends between the pulmonary lobes, or which lines the anterior mediastinum, etc., may be solely and separately attacked with inflammation. Thence several varieties of pleurisies, to which we shall advert presently.

The lung of the side where the effusion exists should engage our attention, as well with respect to the different position which it assumes, as also with respect to the alterations of texture which it may undergo.

In the most ordinary cases the effusion has a tendency to press the lung against the vertebral column. When the collection is very considerable the lung now exists only in the form of a thin lamina, occupying a very small space along the spinal canal; and if it is covered with thick false membranes, one would suppose at first view that it has completely disappeared. It is in cases of this kind that it has been said that the lung was destroyed by suppuration; it is, however, intact, and inflation commonly restores it to its natural size. At other times the lung is not compressed to its entire extent towards the vertebral column; one lobe only, for instance, is compressed by the effusion. Thus we have seen the lower lobe alone thrown towards the spine, whilst the upper lobe, which retained its ordinary place, formed a real vault which limited the effusion superiorly. Another time we saw the lung, instead of being carried towards the vertebral column, pressed, on the contrary, towards the ribs, both posteriorly and laterally, and the liquid occupy the anterior and internal part of the cavity of the pleura. Lastly, in a case of effusion almost entirely serous, the three lobes of the right lung, which were widely separated from each other as far as the root of the organ, and having lost but about one-third of their ordinary size, floated, free from all adhesion, in the midst of the liquid. These different positions are very necessary to be known, inasmuch as they modify several symptoms, as we shall see.

The extremely small space which the lung may be reduced to occupy in cases of considerable effusions, without its texture being altered, proves how different its apparent volume, owing to the air which distends it, is from its real volume. In this state the lung no longer crepitates; it is dense, sinks in water; appears to be nearly reduced to the state of the lungs of a fœtus which has never respired, or whose respiration has been but very incomplete; its smooth appearance, and the difficulty with which it is torn, distinguish it sufficiently from a hepatised lung.

Sometimes a pleuritic effusion and inflammation of the pulmonary parenchyma may exist simultaneously; but this complication is uncommon.

We shall not dwell here on the occasional causes of pleurisy, such as the impression of cold air, the introduction of cold drinks into the stomach, the sudden suppression of perspiration, or of any evacuation whatever kept up for a long time. We know, for instance, that after the amputation of a limb affected with white swelling effusions of pus are often formed in the pleura.

External violence on the thoracic parietes sometimes occasions pleuritis.

Inflammation of the pleura recognises also for a frequent cause certain organic lesions of the lung. Thus inflammation of this organ almost always occasions a slight inflammation of the enveloping membrane, and it is much more uncommon to find pneumonias without pleurisy than pleurisies without pneumonia. Pulmonary tubercles, whilst still crude and few in number, very frequently occasion slight partial pleurisies, which are announced particularly by pain, and which give rise to cellular adhesions of the pleura, adhesions which are nearly constant in phthisical patients. When tubercles are immediately developed under the pulmonary pleura, they cause a more intense pleurisy, and one which generally terminates in effusion. Finally, among the organic causes of pleuritis we must place solutions of continuity of the lung on its external surface, the result of which is a free communication between the cavity of the pleura and the bronchi. This solution of continuity depends sometimes on mere tearing

of the pulmonary parenchyma without any other accompanying lesion, sometimes on the opening into the pleura, either of a tuberculous excavation, or of a gangrenous mass, or on the sanguineous effusion constituting pulmonary apoplexy. The pleurisies produced by this cause are frequently partial; the purulent collection is circumscribed by false membranes, which, arising from the edge of the pulmonary fistula, form partitions which are attached by their other extremity to some point or other of the thoracic parietes. These pleurisies, which are ordinarily acute, sometimes take on a chronic character, and may even be more or less completely latent: thus the peritonitis, which is the result of an intestinal perforation, sometimes presents itself also in a chronic form.

148. Let us now pass in review the different symptoms which announce the existence of pleurisy.

The pain, one of the most characteristic signs of this disease, presents numerous varieties with respect to its seat, its intensity, and its duration. Most generally it is felt on a level with or below one or other breast, though the inflammation which it announces exists over a much greater extent. It also manifests itself, but much more seldom, in other points. We have seen it felt, for example, in the hollow of the axilla, under one or other of the clavicles, along the sternum, in the supra and infra-spinous fossæ of the scapula. At other times the pain occupies all one side of the thorax; it extends, for instance, either laterally from the hollow of the axilla to the last ribs, or anteriorly from the clavicle to the base of the chest. In some cases, it prevails principally along the cartilaginous edge of the false ribs; this is particularly the case when the inflammation has attacked the portion of pleura which lines the upper surface of the diaphragm. In this latter case it occupies very often one or other of the hypochondria, is felt at the epigastrium, and extends even to the flank, so that it might be considered as the sign of an abdominal affection.

The pleuritic pain, whatever be its seat, is increased by percussion, by intercostal pressure, by lying on the affected side, by inspiration, by the cough and the different movements of the trunk.

In several patients this pain is very acute, either in a continued form, or only at intervals. Patients are then in a state of great anxiety; they make but very short inspirations through fear of increasing the pain: they have an extraordinary dread of the slightest effort of coughing. In other individuals, the pain, which was very moderate, is felt only on making deep inspirations; it is scarcely increased by percussion and pressure. Finally, there are certain pleurisies with or without an effusion, which are not indicated by any pain, either at their onset, or during their progress. We never should lose sight of the possibility of the existence of these pleurisies which are entirely free from pain. It should be known that the pleura, as well as the serous membranes of the pericardium and abdomen, may be inflamed, be filled with pus, be covered with false membranes, be disorganised, without these serious changes being announced by any species of pain.

The pain usually exists from the commencement of the pleurisy. Sometimes it is wandering and fugitive, and it is not till the lapse of some days that it becomes fixed and continued. In this case it is often taken for a mere rheumatic pain. It must be acknowledged, in fact, that it is often very difficult to distinguish the pain, which has its seat in the muscles of the thoracic parietes, from that which depends on an inflammation of the pleura. This latter, to be sure, is generally accompanied by more serious symptoms; however, on the one hand, mere muscular pain may be accompanied with fever and dyspnœa, and on the other hand the pain may be owing to an inflammation of the pleura, though we may observe neither difficulty of breathing nor acceleration of the pulse. With respect to the local signs: the only ones which can have any value to establish the distinction in question, are, 1st, the increase of pain by slight pressure made

on the ribs, as also in the intervals between them; 2dly, the great extent of the pain; 3dly, its inconstancy.

These different signs seem rather to announce that the pain has its seat in the muscles; but they cannot afford an entire certainty of it.

After having been very acute during the commencement, the pain usually diminishes in intensity, it becomes very dull, and ceases even entirely long before the termination of the disease; this, at least, is the most general case. Sometimes, after having disappeared, it shows itself anew with great violence; this is a sure sign of the return of the inflammation.

It is to an inflammation of the pleura that we must attribute the stitch in the side which marks the onset of most pneumonias. It is also to pleurisies, less remarkable for their severity than for the frequency of their return, that we must refer the pains in the chest in the course of phthisis, and which are felt principally under the clavicles, in the hollow of the axilla, between the shoulders at the upper part of the dorsal region, that is, in the points where a greater number of cellular adhesions is found after death.

149. The breathing is usually impeded; the inspiratory movements are short, hurried, and occasionally in jerks (*saccadés*). As long as there is no effusion, the dyspnœa is solely the result of the pain which opposes the free contraction of the muscles to which the chest owes its dilatation. Often even the latter is perceptibly less on the side where the pleurisy exists. When the effusion has taken place, it may be readily conceived that the difficulty of breathing may be directly proportioned to the quantity of the effusion. Such is generally the case: there are, however, numerous exceptions in this respect. It would certainly never be admitted, *à priori*, that there are persons whose breathing does not appear impeded, though one of the pleuræ may be the seat of an effusion considerable enough to have dilated the side of the chest where it exists. Not only do these patients seem to have no dyspnœa, when they remain quiet in their bed, but they even speak, get up, walk, and make long journeys without their breath becoming so short as to make them complain of it. This absence of dyspnœa is met not only in cases where the accumulation of fluid has taken place slowly; it is also observed in persons whose pleuritis has terminated in a few days by a profuse effusion. Some feel their breathing so free, that they cannot be persuaded that their chest is affected. These facts prove that the breathing may continue to go on freely, though it may be only a single lung which receives air. Here pathological observation is in accordance with experiments on living animals. In order that this happy result should supervene, it is necessary that the inflammation should be arrested, that the fever should cease, and that the liquid which fills the pleura should be brought to the conditions of a liquid contained in a natural reservoir, as bile in the gall-bladder, urine in the bladder. But from the circumstance that the breathing does not seem to be, in this case, manifestly impeded, we are not to infer that, in persons one of whose lungs has become impervious to air, the health can be as perfect as if the two lungs were able to act. Observation proves, that at the end of a longer or shorter time these patients become emaciated, all their functions become languid, so that if the effusion is not gradually absorbed, they die, in consequence, no doubt, of defective hematosis.

With respect to the greater or less freedom of breathing, patients labouring under pleuritis with an effusion similar with regard to the quantity and quality of the liquid may be divided into three classes. In some the dyspnœa does not cease to be considerable from the commencement of the pleurisy to the termination, which is then constantly fatal. In others the breathing is at first very much impeded, then the dyspnœa diminishes, and ultimately disappears before the absorption of the effusion. In others, in fine, both from the onset, and during the progress of the affection, the breathing always continues very free.

The movements of the elevation and depression of the thorax undergo modi-

fication connected with some varieties of pleurisy. Thus in costo-pulmonary pleurisy the breathing is principally diaphragmatic; on the contrary, in inflammation of the pleura lining the diaphragm, this muscle becomes immoveable, and the dilatation of the thorax is principally the result of the elevation of the ribs.

150. The cough never occurs in kinks; it is small, as if cut short, and more or less frequent. It may even be entirely wanting, though the inflammation is intense and a considerable effusion exists in the pleura. This total absence of cough has been well ascertained by us in more than one case; it is easy to see that the cough may very naturally not show itself in persons not very irritable, whose bronchial mucous membrane is not symptomatically irritated by inflammation of the pleura. We should not forget, then, that a very severe pleurisy may exist, though the patient may have no cough.

151. When the cough exists, it is dry, or accompanied by an expectoration purely catarrhal. Aretæus clearly laid down the difference between pleuritis and pneumonia, with respect to the expectoration. There are scarcely any sputa, he says, in pleuritis, *sputa vix exsecreta*, whilst they are more profuse and bloody in the case of pneumonia.

We do not find ideas so clear either in the writings of Hippocrates and Galen, or in the works of several physicians of the two last centuries, who seem to have often confounded the symptoms of these two inflammations.

When pleuritis has terminated in effusion, the expectoration always remains catarrhal. Sometimes, however, when a communication is set up between the cavity of the pleura and of the bronchi, the effused liquid is discharged through the trachea, and is found in the expectoration. The particular nature of the sputa, and the manner in which they are thrown up, are generally considered as unequivocal signs, by help of which we may readily recognise the existence of a pleuritic effusion opening into the bronchi. Thus the extreme fœtor of the sputa, their alliaceous odour, or an odour similar to that of phosphuretted hydrogen, has been considered one of the surest marks that the sputa which present this odour arise from a pleuritic effusion. But we have observed a similar fetor in persons affected with simple chronic bronchitis (see *ante*); these latter cases are however very rare. On the other hand, we have seen patients whose sputa were inodorous, or but very slightly fetid, though there was found in them a communication between the cavity of the pleura and the air-passages. It is said that in cases of this kind a liquid has been easily made to pass from the cavity of the pleuræ as far as the large bronchi, but that it has been impossible to force the air from the bronchi into the pleuræ, by reason of a peculiar disposition of the air-tubes. It has been then thought that the same was the case during life, and that the sputa remained inodorous, because the air, not being able to penetrate into the cavity of the pleuræ, had not been in contact with the purulent collection.

The other qualities of the sputa, such as their colour, consistence, and form, may also be found in chronic bronchitis.

It is also an opinion generally laid down, that in the case where the matter of the effusion has been discharged through the lung, this evacuation takes place suddenly, and in great quantities at the time; the patient seems really to vomit pus: but this can only occur where a large opening is suddenly made. If, on the contrary, the opening is at first small, and enlarges only by degrees, it is clear that the evacuation of the pus should take place but slowly, and in small quantity at the time. Now, in this latter case, it is very difficult to ascertain the real origin of the matter expectorated; at the very most it can only be presumed, from the aggregate of the symptoms which indicate the existence of a pleuritic effusion; the diagnosis would acquire additional certainty, if these symptoms were observed to disappear according as the expectoration is established. In the case of a sudden discharge of a great quantity of pus, it cannot be affirmed that the liquid discharged has come from the cavity of the pleuræ;

for it may also come either from a vast tuberculous excavation, into which a large bronchial tube has opened, or from the pulmonary mucous membrane itself.

What do these remarks prove? This, that here, as in many other cases, we should not judge from a single sign of the nature of a disease.

The discharge of a pleuritic collection through the bronchi may be removed by restoration to health, or by death. In the first case, after the abscess (*foyer*) has been emptied suddenly or gradually, its parietes cease to secrete pus anew; they approximate, and unite by adhesions which become more and more intimate, and the patient recovers. It is very advantageous then that the collection should empty itself but slowly, in order that the lung, which has been a long time compressed, may allow the air to penetrate it gradually, and thus recover its original size. In the second case the patient often dies asphyxiated; at other times the exhaustion occasioned by the profuse morbid secretion going on in the pleura, carries him off more or less rapidly. We shall cite here a somewhat curious case on this subject, contained in the *Sepulcretum* of Bonetus. It is that of a patient, in whom a sword penetrated through an intercostal space into the interior of the chest: but little blood flowed from it. The external wound was cicatrised in a little time; but the patient, who thought himself cured, felt that his breathing was no longer free; his pulse was habitually feverish; he had a dry cough, and wasted away in a frightful manner. Suddenly he was seized with a violent fit of coughing, and expectorated an enormous quantity of purulent matter. His recovery was rapid and complete. It is probable that in this patient a bronchus, perforated perhaps by the sharp instrument, opened a passage to the pus collected in one of the pleuræ.

This termination of chronic pleuritis is rather uncommon. In most of the cases where a purulent collection has been found in the pleura with pulmonary fistula, the cavity of the pleura did not communicate directly with the bronchi, but with a tuberculous excavation of greater or less depth, or a gangrenous ulcer; in this case there had first been an opening of this accidental cavity into the pleura, then consecutive pleuritis.

152. Decubitus on the affected side has been considered as one of the pathognomic signs of pleuritis with effusion. Here is what our observation has taught us on this subject; in the great majority of cases, whether no collection as yet exists, or whether there is effusion already, the patient lies on his back; several patients have, however, a perceptible tendency to incline a little towards the affected side (diagonal decubitus); it is certainly but the smallest number which lie entirely on the side where the effusion exists. For this it is necessary that there should be no longer any pain, and that the effusion should be very considerable. As long as there is fever and dyspnœa, decubitus on the side opposite to that of the effusion is impossible. When the pleuritis becomes latent, and when, notwithstanding the existence of a copious collection in one of the pleuræ, there is no longer either any perceptible difficulty of breathing, or febrile disturbance, then lying on the affected side often perceptibly hurries the breathing, and becomes painful to the patient. Finally, some placed under the same circumstances can lie in any position; they lie alternately on the back, or on either side, without the dyspnœa being increased in any of these positions.

When the diaphragmatic pleura is the particular part inflamed, lying in the horizontal position often ceases to be possible; the patients continue to sit up in the bed, they incline the trunk forwards more or less, as if this position alleviated their pain. This sign, however, is not so constant as not to be sometimes wanting.

From the preceding observations it follows that in the majority of cases of pleuritis, with or without effusion, decubitus affords no sign which can detect the nature of the disease. We should add, however, that under some circumstances decubitus on the back, with slight inclination towards the side of the effusion, or entire decubitus on this side, are so marked, that they alone, without further

examination, may incline us to suspect the existence of a collection in the pleura. We have seen, for instance, phthisical patients who, after having for a long time lain indifferently in all positions, could subsequently lie only on one side through fear of suffocation. This unusual mode of lying inclined us to examine the state of the chest, and we often ascertained the presence of an effusion, which had formed imperceptibly, without well-marked exasperation of the symptoms of the original disease, and often even without pain.

153. Among the signs which we have now passed in review, none can be really considered as pathognomonic, none can announce with certainty the existence of a pleuritic effusion. However, if each of these signs, taken separately, has little value, their combination may give rise to probabilities which are almost equivalent to a certainty. But it still remains for us to examine the value of other more positive signs, and which, added to the preceding, render the diagnosis of pleurisy almost always easy and sure: these signs are afforded by measuring the thorax, by percussion, and by auscultation.

154. In a certain number of cases, the side of the chest where the effusion has its site, becomes evidently larger than the opposite side. Should the affected side be larger than the other by five or six lines, this enlargement is perceptible to the sight; but in this point one may be very easily deceived, and we should be certain that one side of the chest is really dilated, only when it has been measured comparatively with the other by means of a riband, one extremity of which is fixed on the spinous process, and the other on the middle of the sternum. In no case have we seen this dilatation exceed an inch and a half. In this state of dilatation, the ribs and their cartilages are in the situation in which they are found during deep inspirations; the intercostal spaces are very much protruded, and go beyond the level of the ribs; an evident fluctuation may sometimes be perceived in these same spaces through the muscles. When these symptoms exist, no doubt can be raised regarding the nature of the disease, for mere hepatisation of the lung never produces them. It is principally after the existence of these symptoms that the old surgeons determined on performing the operation of empyema. But dilatation of one of the sides of the chest is far from being a constant phenomenon; it may not even exist where several pints of liquid are effused in the pleura, and where the compressed lung is impervious to air. The dilatation of the chest on the affected side may take place in a very short time: we have sometimes found it carried to a very high degree from the fourth or fifth day of an acute pleuritis.

When the effusion begins to be absorbed, and any cause prevents the lung from dilating and approaching sufficiently towards the ribs, the latter are perceived to become depressed in order to make up for the vacuum which exists between them and the lung. The side of the chest where the effusion existed, then becomes narrower than the healthy side. Laennec has given some valuable observations on this subject in his work. This partial or general narrowing of one of the sides of the chest may exist without at all interfering with health.

155. As soon as a slight effusion commences in the pleura, it is announced by diminished sonorousness of the thoracic parietes on the side where it exists. According as the effusion increases, the thorax, when percussed, yields a sound which is constantly becoming more dull. At first this dulness of sound exists only inferiorly, then it is heard over the entire extent of the affected side, from the supra-spinous fossæ and clavicle to the base of the thorax.

When there is double effusion, the sound is equally diminished on both sides at once; and, if the collection is not profuse, the diminished sonorousness, equal on the right and left, may not be remarked, or may be considered as natural. It is well known, that in several persons enjoying very good health the chest, when percussed, yields much less sound than in others who appear placed under the same circumstances.

In some cases of circumscribed effusions, the dulness also exists only over a limited space. Thus in one individual we discovered dulness of sound only at the middle and lateral part of one of the sides of the chest; in another we noticed it only on the level of the costal cartilages, and behind a part of the sternum.

In other cases of circumscribed effusions, the sonorousness of the thoracic parietes is not diminished in any part, and the diagnosis then becomes very obscure. This occurs in several cases of interlobular or diaphragmatic pleurisies, or again when the inflammation is confined to the portion of pleura which lines the inner surface of the lung and the mediastina.

It should be mentioned here that the pain sometimes renders percussion entirely impracticable.

156. When in an individual affected with pleuritis, with or without effusion, we apply either the naked ear or the stethoscope to the chest, we obtain more varied and more precise signs than those afforded by percussion.

From the onset of the disease, when there is not yet any effusion, whilst the pain is very acute, the respiratory murmur is perceptibly weaker on the side where the pain exists, than on the opposite side. On this same side the thoracic parietes are much less dilated. Percussion, when it can be employed, yields a sound equal on both sides. Such are the phenomena observed at this period; they may be explained in this way: the respiratory murmur is weaker on the affected side, because the intensity of the pain instinctively inclines the patient to dilate the thoracic parietes of this side much less than the opposite. Thence a diminution in the quantity of air which enters the lung in a given time. This is so true, that if the pain is less acute the thorax is dilated equally on the two sides, and there, also, the respiratory murmur on the two sides is equally intense.

From the time the effusion begins to form, the respiratory murmur is a little weaker than on the healthy side. According as the effusion increases, the respiratory murmur becomes still weaker, whilst on the other side it acquires much greater intensity than in the natural state. What should be well remarked is, that when the effusion is already sufficiently considerable, the respiratory murmur continues to be heard, but only much more feebly than on the side where there is no effusion. We have heard it very distinctly in a case where the pleura contained more than a pint of liquid. Lastly, when the effusion becomes still more profuse, the respiratory murmur ceases entirely, either only in the inferior and posterior part, or through the entire extent of one side of the chest. In consequence of the variable positions which the lung, compressed by the liquid, may assume, the signs afforded by auscultation, with respect to the presence or absence of the respiratory murmur in certain parts, may present some anomalies which it is important to notice. Thus, in the very great majority of cases, the lung is entirely compressed towards the vertebral column, and the respiratory murmur continually ceases to be heard from below upwards, anteriorly and posteriorly, the patient being supposed to be sitting in his bed. But the lung, instead of being inclined towards the vertebral column, is compressed directly from before backwards, and continues applied to the ribs in the form of a somewhat thin lamina. Then the respiratory murmur is no longer heard anteriorly, whilst posteriorly it is still heard. The lower lobe of the lung may be retained in its ordinary place by old adhesions; effusion can then take place only in the space occupied by the upper lobe; the respiratory murmur is wanting only in this part, and this unusual circumstance may cause one to mistake the real nature of the disease.

When the effusion is considerable, we have said the respiratory murmur is absent; but sometimes it is not replaced by any other murmur, whilst we sometimes hear the *bronchial respiration*, the characters of which we have already

described, and the cause of which we explained when speaking of pneumonia. We then said that it might manifest itself every time the air could not reach beyond the bronchi: in the case of pneumonia, hepatisation of the pulmonary tissue prevents the introduction of air into the vesicles; in the case of pleuritic effusion the mechanical condensation of the pulmonary tissue produces the same effect. Observation also shows that the first of these causes produces bronchial respiration more frequently than the second. One may satisfy himself of it by running through the particular cases of pneumonia and pleurisy.

When the bronchi are full of mucus, the interposition of a liquid between the lungs and the ribs does not prevent the different rales from being heard to which the accumulation of this mucus may give rise. This remark is not devoid of importance, for the existence of these rales may incline one to think that the lung is in immediate contact with the ribs, and consequently may occasion the disease to be mistaken.

When we make a healthy person speak, whilst the ear is applied over the chest, we sometimes hear over all the points a greater or less resonance which presents itself, according to the individual, with a thousand modifications of tone and intensity; sometimes this resonance is altogether absent. If we apply the ear over the chest of a patient whose pleura is the seat of an effusion, it often happens that on the side where this effusion exists the resonance of the voice is quite different from what it is on the opposite side. In several cases it approaches somewhat to the timbre of the goat's voice; thence the term *ægophony*, as Laennec has designated this modification of the voice. But we deem it important to remark that this word *ægophony* is but a generic term under which must be comprised numerous modifications which no longer resemble the tremulous voice. Thus, for instance, Laennec has himself remarked that oftentimes it is no longer a tremor that is heard, but a noise altogether similar to the voice of the *Punchinello*. At other times it would appear that the voice passes through a trumpet; or else it is as it were smothered, and the articulation of each word is accompanied with a sort of peculiar souffle. In others there is merely a stronger resonance of the voice on the side where the effusion exists. Oftentimes the different shades of ægophony exists only at intervals, and are not marked except in the pronunciation of certain words. We have seen a patient, for instance, in whom the tremor of the voice existed only, but in a very marked manner, when he pronounced the word *oui*.

It may be readily perceived that, from these numerous varieties in the resonance of the voice, frequent illusions might result, and that it would even be possible that a phenomenon of the healthy state might be considered as a pathological effect. But there is a sure way to avoid error, and that is never to state whether there is or is not ægophony, before also hearing the voice on the side presumed to be healthy. Often, after having thought that there was ægophony where the other signs announced an effusion, the error was not discovered till the ear was applied to the opposite side.

The voice presents no modification as long as the effusion is inconsiderable; the different varieties of ægophony appear when the effusion becomes more copious; if it still increase, the peculiar resonance of the voice again disappears. However, this rule is not as constant as it is stated to be. We have very distinctly heard the voice resound quite differently from what it did on the healthy side, in a case where an enormous effusion existed in the pleura; the *bronchial respiration* was heard at the same time to a very great degree. In these two cases the cause of the resonance of the voice is probably not the same. When the effusion is inconsiderable, the sound of the voice is modified by the mere fact of its transmission through a liquid, then the lung is but slightly compressed; but if, in consequence of the increase of the effusion, this compression becomes extreme, if the air can no longer penetrate beyond the large bronchi, it vibrates in these after a particular manner, which gives rise on the one hand to

the *bronchial respiration*, and on the other hand to a peculiar resonance of the voice, which approaches more or less to a real tremor. The nature of the body interposed between the lung and the ribs, appears no longer to have any share in the production of these phenomena; this is so true that they are found to be absolutely identical in cases where the pleura is not the seat of any effusion. We have seen, accordingly, that when a lung is hepatised we hear simultaneously with bronchial respiration a peculiar resonance of the voice, which sometimes resembles that which exists when there is dilatation of the bronchi, sometimes simulates pectoriloquy more or less perfectly, and sometimes approximates the tremor which constitutes real ægophony.

We think we may conclude from the preceding considerations, that the difference which exists between the resonance of the voice produced by an effusion into the pleura, and the resonance of the voice heard in the case of pulmonary hepatisation, is not sufficiently marked in all cases to warrant us in considering ægophony as the certain pathognomonic sign of a pleuritic effusion. However, a distinction should be laid down here. If, at the same time that the sound is a little dull, and that there is ægophony, we hear the natural respiratory murmur without the mixture of any crepitous rale, but only weaker than on the opposite side, we may be certain that there is effusion, and not pneumonia; if, on the contrary, with a sound very dull, and a resonance of the voice which approaches more or less closely to tremor, no respiratory murmur is heard, or if this has been replaced by the sound of the bronchial respiration, it appears to us impossible to decide, from these signs alone, whether there is effusion into the pleura, or inflammation of the pulmonary parenchyma. In this case the absence of all sanguineous expectoration is a very strong presumption in favour of the existence of an effusion; we become certain of it, if it be observed that the affected side is more dilated than the other.*

157. Inflammation of the pleura is accompanied by a more or less marked disturbance of the different functions. Thus in the most ordinary cases the circulation is hurried, the heat of skin is increased; in a word, there is fever. In the acute form, the pulse is remarkably hard; it contrasts with the soft pulse of pneumonia, with the small and contracted pulse of inflammation of the abdominal serous membrane.

As long as the pleuritic inflammation continues unabated, the fever also continues; when it is lessened, or has passed into the chronic form, the skin loses its heat, but the pulse retains an habitual frequency which every evening

* To the physical signs now mentioned may be added the following, which appear to me of great value, the perfect accuracy of which I have verified with M. Reynaud, who first pointed them out. We shall give them in that gentleman's own words.

"The more or less complete absence of the vibrations of the thoracic parietes, perceived by the hand when applied to them, whilst the patient is speaking, is a certain sign, when it exists but on one side, that a greater or less pleuritic effusion exists on this same side. This mode of examination does not require either that the patient should sit up, or that he should be stripped. By attending to the difference existing in this respect on the two sides of the chest, we may ascertain the quantity of the effused liquid; this examination, made at different heights in the affected side, often enables us to ascertain the height which it has attained, and to determine its level. In cases where pneumonia shall coincide with the pleuritic effusion, and then very often the symptoms belonging to inflammation of the parenchyma of the organ are entirely wanting, we shall see one of its signs to appear (the crepitous rale) by making the patient lie on the belly. In this case, also, we shall find ægophony to become bronchophony. The patient lying in this same position, whether pneumonia exist or not, the effusion will be discovered by the following signs: a very marked sound, similar to that of two bodies rubbing one against the other, a little jerky (*saccadé*), taking place alternately from above downwards, and from below upwards, in the movements of expiration and inspiration, and more or less marked, more or less rapid, according to the extent and rapidity of these same movements, will be very perceptible to the ear, whether naked, or armed with the stethoscope applied over the affected side. Several anatomical circumstances, easily appreciated, may prevent this phenomenon from always taking place."

becomes increased; every evening, also, the temperature of the skin is raised. There does not seem to be any profuse perspiration, except in the case where tubercles are developed in the pleura or in the false membranes lining it.

Lastly, in a still more chronic form of the disease, the pulse itself loses its frequency, and all febrile disturbance disappears. This complete apyrexia coincides uniformly with free respiration. In this state the patient is far from being cured; for auscultation and percussion still point out the existence of greater or less effusion; but the patient is placed in conditions most favourable for the absorption of the effusion. This is one of those facts which demonstrate how erroneous the opinion of the ancients was, who thought that fever was necessary for the resolution of most chronic diseases. Observation proves, on the contrary, that a chronic inflammation can scarcely terminate favourably, unless the fever has first ceased. Thus, also, when accidental tissues (tubercles, scirrhus, etc.) are developed in any organ, they in general produce no disturbance as long as fever keeps aloof. The latter, far from favouring their resolution, as was admitted by the ancients, is the sign of their softening, and it is from the appearance of febrile disturbance that we are to date the supervention of serious symptoms.

The blood taken from the vein has almost always presented a dense coagulum, covered with a thick buffy coat. The cases where this latter appearance is wanting are so few in number, that we think they should be considered as exceptions to a very general rule. The almost constant existence of buffy blood in persons labouring under pleuritis is besides a phenomenon which for a long time back has engaged the attention of observers.

The digestive functions present no perceptible disturbance except in the case of complication.

It has been observed how often the serous infiltration of the extremities in the same side as the effusion coincides with this effusion. We have observed this coincidence but once.

The urinary secretion is diminished, disturbed, and perverted as in all cases of inflammation.

Lastly, nutrition properly so called usually presents considerable alteration, the result of which is marasmus, when there is chronic pleurisy with effusion. The emaciation is particularly marked, when there exist fever and dyspnœa; on the contrary, when the breathing is not much embarrassed, and there is no fever, a considerable effusion into the pleura may exist for a very long time without nutrition appearing to be altered in any way.

158. Let us now recapitulate the different symptoms which we have passed in review, and present them in their usual order.

The invasion of pleuritis is marked by a pain most frequently seated below one of the breasts, preceded or accompanied by shivering; at the same time there is observed a dry cough, some dyspnœa, some fever, and often greater weakness of the respiratory murmur on the side where the pain exists. If no effusion takes place, these symptoms usually disappear after the lapse of some days, and the patient is restored to health.

If the pleura becomes the seat of an effusion, new symptoms appear: on the side where the effusion is, the sound is dull; the respiratory murmur is at first weak, then altogether gone, or succeeded by bronchial respiration; the voice presents the different varieties of resonance already mentioned, the thoracic parietes on the affected side undergo more or less marked dilatation.

This series of phenomena may terminate fatally in a very short time; such a termination should be apprehended, if the breathing be very much impeded, and the fever very intense. If, on the contrary, the dyspnœa diminishes, and also the febrile disturbance, the disease is prolonged; it passes into a chronic state, and then may terminate either in death or in recovery.

Death most frequently supervenes in this case, in the midst of a state of marasmus, which seems to result both from the insufficiency of the hematosis,

occasioned by the complete inertia of one of the lungs, and from the existence of a chronic inflammation, with copious suppuration and frequent production of accidental tissues. At other times death is owing to the sudden exasperation of the pleuritis, which having existed with impunity for several months in the chronic form, becomes rapidly fatal, as soon as it repasses into the acute form under the influence of a more or less appreciable cause. Finally, the fatal termination has been more than once by a communication suddenly established between the cavity of the pleura and the exterior, either through the thoracic parietes, or through the bronchi.

A favourable termination is announced by the cessation of fever, the diminution of the dyspnœa, the good state of nutrition and of the patient's strength. When this combination of circumstances exists, the absorption of the effusion usually takes place in a longer or shorter space of time ; and if the lung can no longer be dilated sufficiently to be brought in contact with the ribs, the latter are depressed more or less perceptibly, as has been already stated. Sometimes also a rapid recovery takes place, after the effusion has made its exit through the bronchi or thoracic parietes.

Critical phenomena often manifest themselves at the same time that the pleuritis is being resolved. We have seen instances of this in several of the cases cited above.

159. We should have presented but a very imperfect picture of pleurisy, if we did not state that the symptoms which announce it are far from always existing such as they have been now described by us. Thus there are pleurisies with or without effusion, which are accompanied neither by pain, nor cough, nor dyspnœa; nor acceleration of the pulse. There are others where, by reason of the seat of the inflammation, we observe neither dulness of sound, nor any modification of the respiratory murmur, nor of the voice. It will suffice here to retrace those remarkable anomalies on which we have dwelt, whether in the particular cases or in the special examination which we have made of the several symptoms of pleurisy.

We shall also only retrace the principal varieties of pleurisy, having already pointed out the symptoms of each. Thus we should particularly distinguish pleuritis with or without effusion, manifest or latent, double or single, general or partial ; among partial pleurisies, we should particularly note interlobular, diaphragmatic and median pleurisy. Three other varieties may again be laid down according to the nature of the effusion, according as the liquid consists of pus, of serum more or less limpid, or of blood.

160. Among the diseases which most frequently complicate pleurisy, some are seated in the chest, and others outside this cavity. Among the former may be enumerated pneumonia, pericarditis, and lastly pneumothorax. We have seen that the latter is but very seldom the result of a gaseous exhalation of the pleura ; most ordinarily it appears in consequence of a communication accidentally established between the cavity of the pleura and the air-passages. When there is much gas and but little liquid, the sound is dull only inferiorly, whilst more superiorly the sonorousness of the chest is increased, at the same time that the respiratory murmur is gone. However, when the orifice of communication between the pleura and bronchi is very large, there is heard at each inspiration a sort of puff similar to that produced by the entrance of the air into vast tuberculous excavations which are nearly empty. Under other circumstances we have heard real gurgling, at other times, in fine, the metallic tinkling so well described by Laennec. These different phenomena must necessarily vary, according to the size and form of the pulmonary fistula, the nature of the cavity in the lung, and the size of the bronchial tubes which open into it, and the relative quantity of gas and liquid contained in the pleura. The metallic tinkling does not seem to us to be in this case a pathognomonic sign, for we have met it very marked in cases of simple tuberculous excavations. A

much less equivocal sign seems to us to be the succussion of the thorax, as practised by Hippocrates. By it we very distinctly hear a fluctuation of liquid within the chest, which can only exist when the pleura contains gas and liquid at the same time.

161. The prognosis of pleurisy varies according to a great number of circumstances. It is unnecessary to say that pleurisy without effusion is in general much less dangerous than pleurisy with effusion. Dry pleuritis, confined to a small extent, is often a very slight disease, which does not impede the respiration and which excites no sympathetic disturbance. If, on the contrary, it is general, if it exist at the same time on both sides, it may prove rapidly fatal before any effusion has taken place.

The seat of the pleuritis also influences the nature of the prognosis. Thus, observation has taught us that diaphragmatic pleuritis is in general accompanied with more serious symptoms than a more extensive inflammation of other portions of the pleura.

When there is effusion, the unfavourableness of the prognosis is directly proportional to the quantity of the effusion. A double accumulation, even though small, is an almost always fatal case. There have been, however, instances of recovery. In the same manner as, according to the predisposition of the individual, inflammation of the pulmonary parenchyma is sometimes more dangerous than a much more extensive inflammation, in a similar manner a slight effusion often occasions death, whilst other patients do not die of a much more considerable effusion.

It is probable that a purulent collection is more dangerous than a serous collection. Nothing proves that the effusion of blood is accompanied by more serious symptoms than other effusions.

The dyspnœa, and the continuance of fever, are always unfavourable omens. We can scarcely hope for the absorption of the fluid, except when the fever is very moderate, or altogether absent, and the dyspnœa slight.

If, notwithstanding the small extent of the effusion, the patient continues to waste away, and profuse sweats come on, we have reason to apprehend the development of tubercles in the inflamed pleura.

162. The treatment of pleurisy rests on the same basis as that of pneumonia; thus, as we have already dwelt at some length on the latter, we shall say but little here for fear of falling into needless repetition.

Bloodletting must be employed to great extent from the very onset of the disease. When the pain appears, and there is as yet no effusion, leeches applied over the painful side often remove the disease. This effect is obtained with more certainty if general bloodletting be premised. The combination of both kinds of bloodletting is very useful.

When the effusion does exist, we must still have recourse to extensive bloodletting, for the double purpose of preventing the farther progress of the inflammation, and of diminishing the quantity of blood which, in a given time, should traverse the compressed lung. As long as there is great dyspnœa, high fever, and the strength tolerable, we should not dread to follow up bloodletting. We should again have recourse to it if, after the inflammation has passed into the chronic state, it is again augmented.

At the same time that large bloodletting is employed, we must not neglect to keep large emollient cataplasms continually applied to the affected side. This mode of treatment may be particularly effectual in persons in whom the muscles of the thoracic parietes are not thick.

As long as the fever is high, we should not have recourse to revulsives except with great precaution; but when it is lowered, and no signs of violent reaction are observed, a large blister should be applied to the affected side. In irritable persons the blister sometimes recals the fever; we must then diminish its

surface without entirely drying it. If, after the lapse of a certain time, the effusion is not diminished, we can try to change the mode of irritating the skin. We shall dry the blister on the chest, and apply others to the lower extremities. The blister to the chest should be replaced either by a seton, the suppuration of which should be kept up for a long time, or by a moxa.

A period comes when there no longer really exists any inflammation, and when the effusion is no longer injurious except as a foreign body, which compresses the lung. It is then a matter of doubt whether the revulsive means now mentioned can still be of any use. At this period different diuretic and diaphoretic means may be employed with advantage, provided, however, that their action be duly regulated, and that these remedies do not become stimulants, which, being carried into the torrent of the circulation, may awaken the inflammation of the pleura. But what should be particularly recommended at this period, and a thing which must very much promote a cure, is strict observance of regimen. By following these directions attentively, we gradually bring back the pleura to its natural state, and place it in the most favourable condition to bring about the absorption of the effusion.

When, in spite of all the means employed, the effusion continues, must we have recourse to the operation for empyema? This operation has been hitherto employed principally in the case where the effusion was the result of a penetrating wound of the chest; it has particularly succeeded when this effusion was formed by blood. Inflammation is then either gone or very secondary, and no obstacle prevents the lung from dilating and resuming its ordinary volume as soon as the liquid accidentally effused has been evacuated. The circumstances are far from being the same in the case where the effusion is the result of a genuine inflammation of the pleura. Two cases may then present themselves: in the first case the operation is performed when the inflammation still continues, and it is then useless; for we do not destroy the cause, and the liquid is scarcely discharged when it must be again reproduced. In the second case the operation is attempted when there is no longer, properly speaking, any inflammation, and when the liquid collected in the cavity of the pleura is no longer anything but a foreign body, whose presence alone is an obstacle to the cure. But here new circumstances may prevent the success of the operation. Dense and solid false membranes often cover the lung, keep it firmly applied to the lateral parts of the vertebral column, and, like a sort of barrier, do not allow it to approximate the ribs. The operation for empyema may also, in irritable subjects, rekindle an inflammation not perfectly extinguished, in the same manner as in dropsical patients the operation of paracentesis has more than once produced peritonitis.

Finally, the difficulty of distinguishing with certainty, in all cases, whether there be pleuritic effusion or pulmonary hepatisation, is one of the causes which must prevent the frequent employment of the operation for empyema. Shades so delicate, and oftentimes so lightly marked, separate ægophony, the sign of an effusion, from the particular resonance of the voice, the sign of pulmonary hepatisation, that, in our opinion, it would not be prudent to decide on having recourse to the operation for empyema, for the sole reason that the existence of ægophony has been ascertained. We think this operation should not be attempted unless when, besides the ordinary signs of effusion, there is undoubted dilatation of the chest, and manifest fluctuation through the intercostal spaces which project outwards beyond the level of the ribs.

THE END.